

W.Quapp and J.M.Bofill

Sliding Paths for Series of Frenkel – Kontorova Models–  
A contribution to the concept of 1 D – superlubricity

Supplementary Material 4

MF reci golden mean 0.618034 .. N = 6 , ... 49

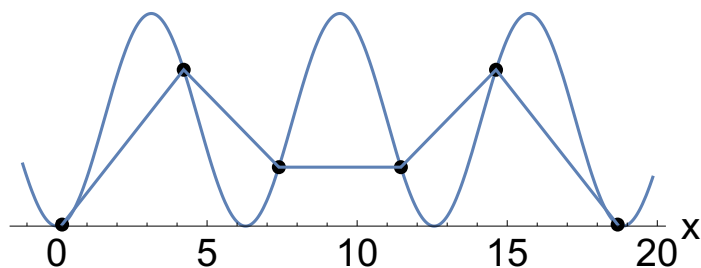
### ### ### ### ### ### ### ### ### # reci GOLDen mean ### ### ### ### ### ### ### ### ###

e – mail : quapp@uni – leipzig.de                      phone wq 0341 × 97 × 32 137

```
golden ratio misfit N = 6 global minimum
setxyz = {{x, 2 Pi - 1.23, 2 Pi - 0.82}, {y, 2 Pi + 0.82, 2 Pi + 1.23},
  {z, 4 Pi - 0.2, 4 Pi + 0.5}, {v, 6 Pi - 1.51, 6 Pi - 0.4}, {w, 6 Pi + 1.2, 6 Pi + 1.75},
  {k, 8 Pi - 0.2, 8 Pi + 0.5}}
a0 = 4. / (1. + Sqrt[5.]) * Pi
goldMean = (1. + Sqrt[5.]) / 2.
Potener6 =
  0.5 * ((y - 4. / (1. + Sqrt[5.]) * Pi - x)^2 + (z - 4. / (1. + Sqrt[5.]) * Pi - y)^2 +
    (v - 4. / (1. + Sqrt[5.]) * Pi - z)^2 +
    (w - 4. / (1. + Sqrt[5.]) * Pi - v)^2 + (k - 4. / (1. + Sqrt[5.]) * Pi - w)^2) + 6. -
    Cos[x] - Cos[y] - Cos[z] - Cos[v] - Cos[w] - Cos[k]
NMinimize[Potener6, setxyz]

SetX = {6.453021193514319, 10.505263869826125, 13.675319820659617,
  17.740606715238318, 20.91066266607181, 24.962905342383614} - 2 * Pi
{0.169836, 4.22208, 7.39213, 11.4574, 14.6275, 18.6797}

SetAA00 = Riffle[SetX, 1 - Cos[SetX]];
XXX = Partition[SetAA00, 2];
Bild = Show[Graphics[ {PointSize[0.02135], Black, Point[ XXX]}] ,
  FormatType -> StandardForm, PlotRange -> All];
Bildline = ListLinePlot[XXX, PlotRange -> All]
sidePot = Plot[
  1. - Cos[x] , {x, -Pi + 2, 6. * Pi + 1.}, Axes -> {True, False},
  AxesStyle -> Directive[20], AxesLabel -> {"x", "SidePot"}, AspectRatio -> 0.36];
Show[sidePot, Bild, Bildline]
```



similar former iMin

```

k = 1.0 ;
as = 6.283185307180;
a0 = 2. / (1. + Sqrt[5.]) * as
Setxx = Table[a0 * (i - 1), {i, 6}];
SetAA = Table[A[i], {i, 6}];
SetX = Setxx + SetAA;
The formula for the FK model for N = 6
VVV = Sum[1 - Cos[SetX[[i]]], {i, 6}] +
      Sum[k/2. * (SetX[[i + 1]] - SetX[[i]] - a0)^2, {i, 5}];
GGG = Table[D[VVV, A[i]], {i, 6}];
Set00 = Table[-0.172, {i, 6}];
Set22 = Table[0.172, {i, 6}];
SetAA00 = Riffle[SetAA, Set00];
SetA0 = Partition[SetAA00, 2];
SetAA22 = Riffle[SetA0, Set22];
SetFl = Flatten[SetAA22];
SetFin = Partition[SetFl, 3];
G2G2G2 = Sum[GGG[[i]]^2, {i, 6}];
NMinimize[VVV, SetFin]
HHH = Table[D[GGG, A[j]], {j, 6}];
{4.63312, {A[1] → 0.169836, A[2] → 0.338857,
  A[3] → -0.37431, A[4] → -0.192245, A[5] → -0.905411, A[6] → -0.73639}}

SetX /. {A[1] → 0.16983588847862674, A[2] → 0.33885651912335,
  A[3] → -0.37430962966744796, A[4] → -0.19224481411177027,
  A[5] → -0.9054109229724217, A[6] → -0.7363903294215322` }
HHH /. {A[1] → 0.16983588847862674, A[2] → 0.33885651912335,
  A[3] → -0.37430962966744796, A[4] → -0.19224481411177027,
  A[5] → -0.9054109229724217, A[6] → -0.7363903294215322` }
{0.169836, 4.22208, 7.39213, 11.4574, 14.6275, 18.6797}

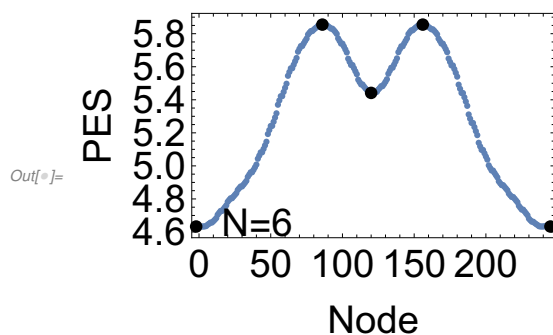
{{1.98561, -1., 0, 0, 0, 0}, {-1., 1.5291, -1., 0, 0, 0}, {0, -1., 2.4456, -1., 0, 0},
  {0, 0, -1., 2.4456, -1., 0}, {0, 0, 0, -1., 1.5291, -1.}, {0, 0, 0, 0, -1., 1.98561}}

```

### Eigenvalues

```
{3.96392, 3.06861, 2.48591, 1.70905, 0.510489, 0.182656}
```

ok it is Minimum



new SP at node85 energy = 5.8522 detHess - 1.58

new iMin at node119 energy = 5.4473 detHess 5.34

```
node85 = {-3.0611222295, 0.8037384450, 5.3885547950,
9.1933932232, 13.2275572319, 17.8757750959};
```

```
node119 = {-4.9349185409, -0.1384267613, 4.5200799160,
8.1970210601, 12.8156989149, 17.6811298673};
```

```
Setxx = node119;
```

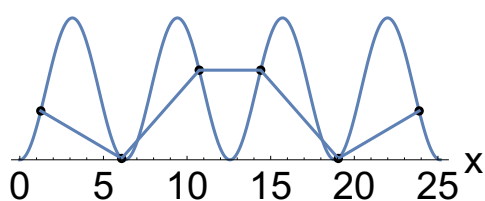
ENERGY 5.4417219420009

```
SetX = {-5.028451662895811, -0.19476297987856206, 4.445391701654621,
8.12097891270455, 12.761133594237734, 17.594822277254984`} + 2. * Pi
```

iMin

Eigenvalues

```
{4.08377, 3.72881, 2.20703, 1.0963, 0.737279, 0.202968}
```



```
node85 = {-3.0611222295, 0.8037384450, 5.3885547950,
9.1933932232, 13.2275572319, 17.8757750959};
```

```
Setxx = node85;
```

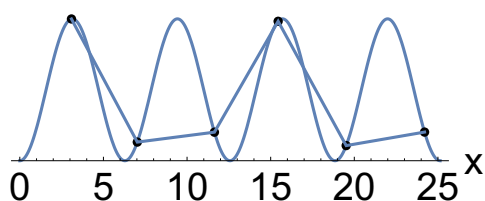
```
SetX = {-3.194463727998168, 0.7416047951064867, 5.353145451790612,
9.163042341321725, 13.231696679931561, 17.917666704934422`} + 2. * Pi
```

Eigenvalues

```
{4.06033, 3.56528, 2.20359, 1.18915, -0.38011, 0.115443}
```

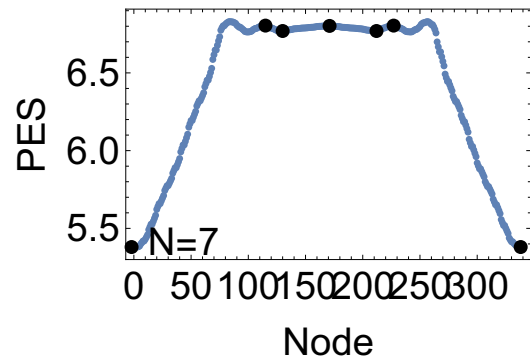
```
ENERGY SP 5.855026744456574`
5.855026744456574 - 5.441721942000908
barrier iMin 0.4133048024556665`
5.855026744456574 - 4.633117231564699`
```

sp hight 6 D gold : global barrier 1.221909512891875



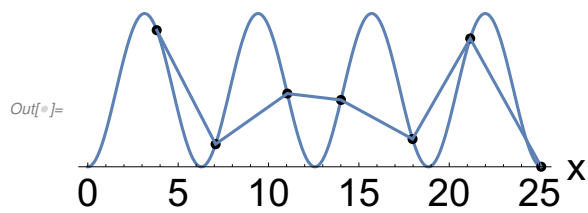
iMinGOLDMean



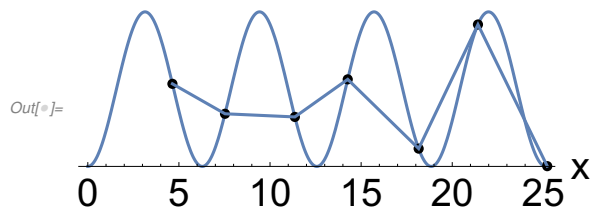


N = 7 SP

SP in data energy = 6.804197, node115 detHess - 2.223  
 node115 = {3.8132399523, 7.0719074498, 11.0400282260,  
 14.0091369158, 17.9700609512, 21.1605679861, 25.0893980932};  
 SetX = node115;



node130 energy = 6.769428 detHess 1.2242  
 node130 = {4.6435455405, 7.5295872921, 11.3634729883,  
 14.2642735354, 18.1570069094, 21.4112392558, 25.2134196859};  
 SetX = node130;



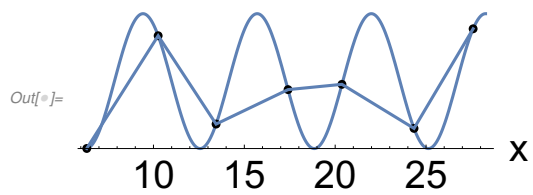
energy = 6.8042046 detHess - 2.882  
 node227 = {6.328895840, 10.2572799258, 13.4460526923,  
 17.4053617343, 20.3726741288, 24.3388501370, 27.5919395306};  
 Setxx = node227;

Out[f]= {6.32889, 10.2573, 13.4461, 17.4054, 20.3727, 24.3389, 27.5919}

**Eigensystem**

```
Out[*]= {{4.05917, 3.53446, 2.65986, 1.989, 0.832167, -0.207877, 0.194344},
  {{0.112508, -0.231789, 0.520846, -0.508725, 0.462337, -0.421551, 0.109879},
  {0.218744, -0.335877, 0.522787, -0.133082, -0.335417, 0.631982, -0.190828},
  {0.66492, -0.439437, -0.0790841, 0.441212, -0.156228, -0.345475, 0.141751},
  {0.502063, 0.00500723, -0.505379, -0.332704, 0.459622, 0.359386, -0.203464},
  {-0.290305, -0.33873, 0.122787, 0.560392, 0.602565, 0.171657, -0.281635},
  {0.0268757, 0.0593108, 0.064142, 0.123192, 0.223439, 0.380648, 0.884111},
  {0.400385, 0.722547, 0.417805, 0.298181, 0.158338, -0.00482721, -0.170442}}}
```

```
SetX = node227;
```



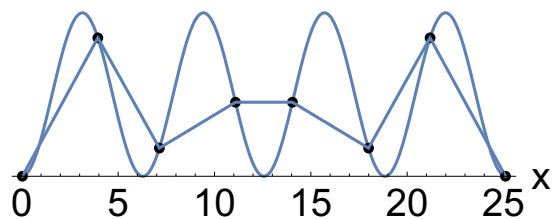
```
N = 8 Golden Ratio, global minimum start a0
```

```
ENERGY 6.8031623431449
```

```
SetX = {0.030962653551941482, 3.945142423449442,
  7.1394974203146795, 11.089283735292637, 14.043457523429382,
  17.99324386854526, 21.187598958855887, 25.10177867152696`}
```

```
Eigenvalues
```

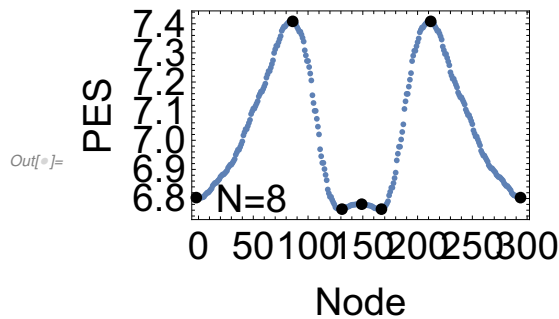
```
{4.091118724213092`, 3.632457372074798`,
  2.810379093187611`, 2.451914855341903`, 1.904363074024926`,
  0.8540611952982249`, 0.2483041014800053`, 0.11573157019069896`}
```



```

node 86 energy = 7.4083555 SP detHess - 7.7734
node86 = {0.4785913578 × 4.8248157750 × 8.1773534302 ×
12.4780604637 × 16.6905720856 × 20.0711359942 ×
24.3913410722 × 28.0362249281};
node131 energy = 6.7635747 detHess 3.2323
node131 = {0.6607751313 × 5.1559228409 × 8.7478297442 ×
12.9661537636 × 17.5736963834 × 21.2244184847 ×
25.5689246042 × 30.3359139975};
node149 energy = 6.7806387 detHess - 1.2476
node149 = {0.8780102326 × 5.5324503953 × 9.5047142549 ×
13.3971269228 × 18.0279811650 × 21.9266161521 ×
25.8897387815 × 30.5396034722};
node 167 energy = 6.763607 detHess 4.394343
node167 = {1.0907917123 × 5.8560386371 × 10.2070100320 ×
13.8531169513 × 18.4591521925 × 22.6846256371 ×
26.2708840824 × 30.7649989233};
node 212 energy = 7.4083057 SP detHess - 7.2430
node212 = {3.3659496625 × 7.0179949993 × 11.3404863035 ×
14.7218724026 × 18.9371331962 × 23.2398593578 ×
26.5940082045 × 30.9421647070};
min energy = 6.803196 detHess 4.71830
node294 = {6.3067902737 × 10.2182397060 × 13.4169035934 ×
17.3671995364 × 20.3214037426 × 24.2707165385 ×
27.4608673419 × 31.3776911376};

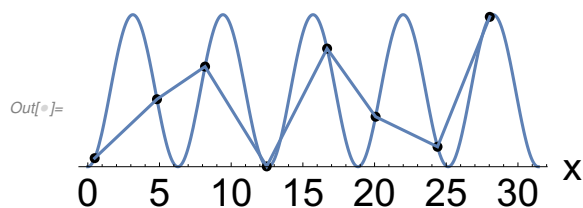
```



```

node86 energy = 7.4083555 SP detHess - 7.7734
node86 = {0.4785913578, 4.8248157750, 8.1773534302,
12.4780604637, 16.6905720856, 20.0711359942,
24.3913410722, 28.0362249281};
SetX = node86;

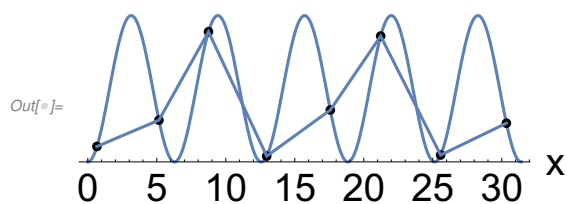
```



```

node131 energy = 6.7635747 detHess 3.2323
node131 = {0.6607751313, 5.1559228409, 8.7478297442,
12.9661537636, 17.5736963834, 21.2244184847,
25.5689246042, 30.3359139975};
SetX = node131;

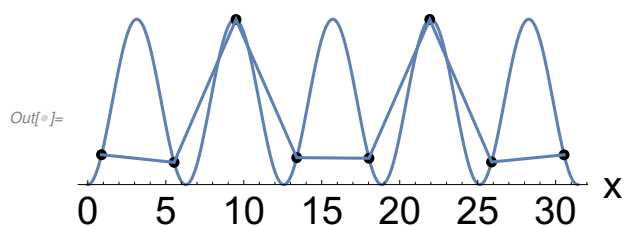
```



```

149 energy = 6.7806387 × 2.4726183180578845 E - 003 detHess - 1.2476
node149 = {0.8780102326, 5.5324503953, 9.5047142549,
13.3971269228, 18.0279811650, 21.9266161521,
25.8897387815, 30.5396034722};
SetX = node149;

```

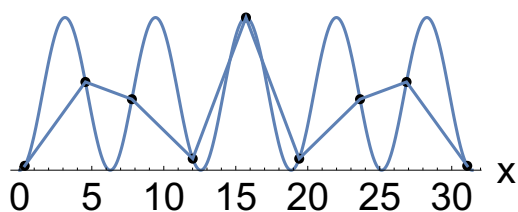


N = 9 Golden Mean local minimum start a0

```

ENERGY 7.279665502315
SetX = {0.3394326247709189, 4.55560684507011, 7.78404622964124,
12.010041130389315, 15.707963267948989, 19.405885405508638,
23.631880306256708, 26.860319690827836, 31.07649391112702`}
Eigenvalues
{4.140587835455634`, 3.809894715887701`, 3.1064121107027987`,
2.879825187806286`, 1.8561701184910318`, 1.6147256940311792`,
0.5805672731343767`, 0.4014350413358556`, 0.022143301277183242`}

```





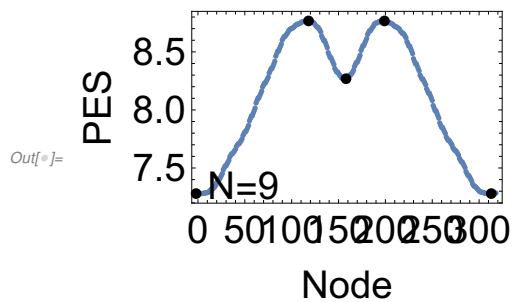
```

sp node118 energy = 8.76630 detHess - 3.5124
node118 = {1.0682450931 × 5.8211615222 × 10.1283173372 ×
13.7885524413 × 18.3886344414 × 22.5439428287 ×
26.1741838610 × 30.6675585125 × 34.4804894102};
iMin node158 energy = 8.268682 detHess 14.2948
node158 = {1.2003923026 × 6.0161918860 × 10.5681588870 ×
14.2100857314 × 18.8493551786 × 23.4884238828 ×
27.1301940391 × 31.6823186767 × 36.4976958729};
sp node199 energy = 8.76625 detHess - 3.0146
node199 = {3.2295161767 × 7.0370802501 × 11.5291277923 ×
15.1601701226 × 19.3120170129 × 23.9100159306 ×
27.5679824428 × 31.8750114707 × 36.6251684739};
min node313 energy = 7.279668 detHess 2.1392
node313 = {6.6248322076 × 10.8418528098 × 14.0706653104 ×
18.2972673923 × 21.9992325885 × 25.6931138593 ×
29.9184970045 × 33.1465702859 × 37.3618951475};

sp hight 9 D gold
8.76625 - 7.279668

```

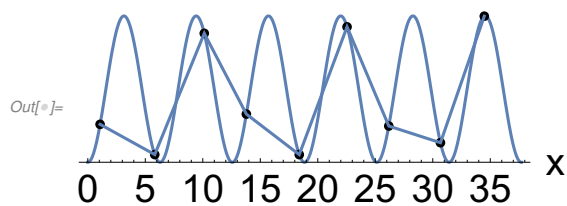
Out[ ] = 1.48658



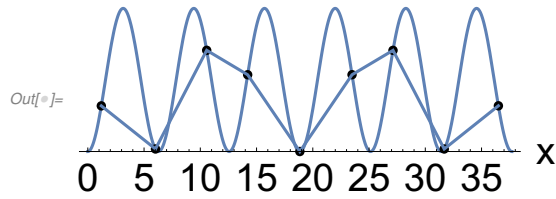
```

sp 118 energy = 8.76630 detHess - 3.5124
node118 = {1.0682450931, 5.8211615222, 10.1283173372,
13.7885524413, 18.3886344414, 22.5439428287,
26.1741838610, 30.6675585125, 34.4804894102};
SetX = node118;

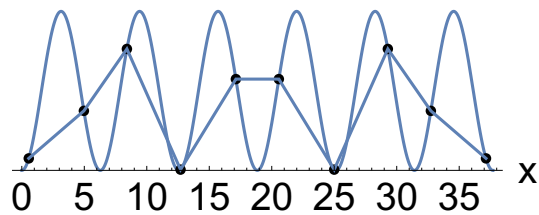
```



```
iMin 158 energy = 8.268682 detHess 14.2948
node158 = {1.2003923026, 6.0161918860, 10.5681588870,
14.2100857314, 18.8493551786, 23.4884238828,
27.1301940391, 31.6823186767, 36.4976958729};
SetX = node158;
```



```
Golden Mean N = 10 global minimum start a0
ENERGY 8.20276715739
SetX = {0.5557891879702443,
4.96662513266369, 8.409605386904797, 12.70215723367503,
17.130078811859242, 20.56903303121828, 24.99695460940249,
29.289506456172724, 32.73248671041383, 37.14332265510727` }
Eigenvalues
{4.208145686370085`, 3.9310757630066946`,
3.3345712742319797`, 3.1770281791233477`, 2.2364534557702633`,
1.535305561399847`, 1.3508230974544642`, 0.6375072583916326`,
0.28618522089115506`, 0.1352619727964243` }
```



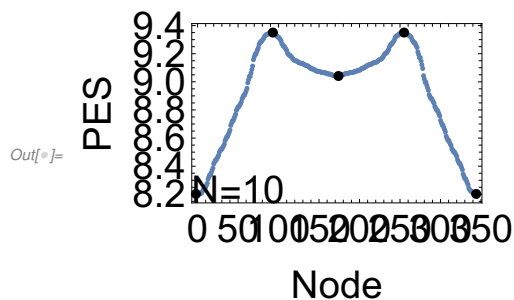
```

sp 93  energy = 9.35038 detHess - 6.4539
node93 = {3.5312361513 × 7.0397828395 × 11.2347807588 ×
14.4582523852 × 18.6306174261 × 22.5857888863 ×
25.9807495040 × 30.1256745329 × 33.3096946927 ×
37.4420112419};
iMin 174  energy = 9.041231 detHess 3.73278
node174 = {6.2205275611 × 10.0370069460 × 13.2787933103 ×
17.1742488116 × 20.0751605952 × 23.9170829976 ×
26.8214069210 × 30.7187922900 × 33.9741544632 ×
37.7803519355};
sp 255  energy = 9.350396 detHess - 6.7474
node255 = {6.5380630218 × 10.6707680529 × 13.8557605001 ×
18.0014187577 × 21.3970273535 × 25.3524167300 ×
29.5257190407 × 32.7496008702 × 36.9455007608 ×
40.4571241525};
min 344  energy = 8.202769 detHess 19.77913
node344 = {6.8404272488 × 11.2510551313 × 14.6941411206 ×
18.9860856140 × 23.4141360347 × 26.8530903126 ×
31.2808824046 × 35.5740404560 × 39.0169162883 ×
43.4279600035};

sp hight 10 D gold
9.350396 - 8.202769

```

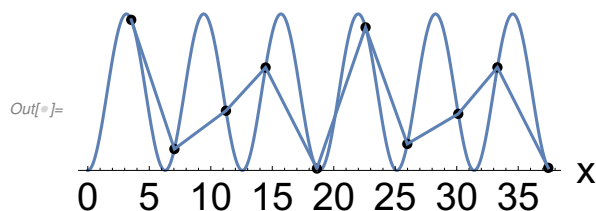
Out[ ] = 1.14763



```

sp 93  energy = 9.35038 detHess - 6.4539
node93 = {3.5312361513, 7.0397828395, 11.2347807588,
14.4582523852, 18.6306174261, 22.5857888863,
25.9807495040, 30.1256745329, 33.3096946927,
37.4420112419};
SetX = node93;

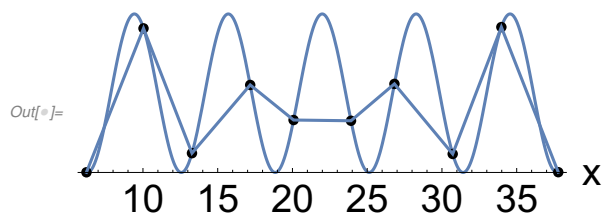
```



```

iMin 174 energy = 9.041231 detHess 3.73278
node174 = {6.2205275611, 10.0370069460, 13.2787933103,
17.1742488116, 20.0751605952, 23.9170829976,
26.8214069210, 30.7187922900, 33.9741544632,
37.7803519355};
SetX = node174;

```

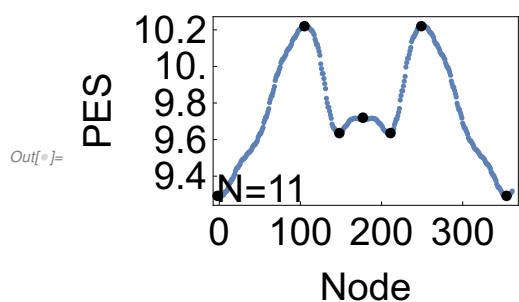
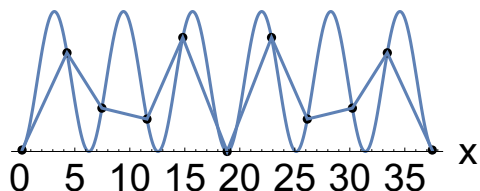


```

### ## ## ## ## ## ## ## ## ## ## N = 11 golden mean misfit ## ## ## ## ##
golden mean misfit N = 11 global minimum
start
node01 = {0.204027 × 4.289860 × 7.463640 × 11.562200 ×
14.817100 × 18.849500 × 22.882000 × 26.136900 ×
30.235500 × 33.409200 × 37.49510}
as = 6.283185307180;
a0 = 2. / (1. + Sqrt[5.]) * as
ENERGY 9.292305379418
ok Minimum

```

```
SetX = node01;
```



```

SP node 108 energy = 10.2197176 detHess - 17.945
asym iMin by 148 energy = 9.6356 detHess 14.749448
iMinSP by 179 energy = 9.7082 detHess - 1.78297087
node108 = {0.5181263964, 4.9276785140, 8.3603160497,
12.6674816805, 17.0755861816, 20.5042594985,
24.9294146669, 29.1526413578, 32.6062086671,
36.9882497636, 40.7178035632 };
Setxx = node108;

SetX = {0.5456620367023799, 4.947868216659033,
8.377671753761076, 12.67345501894052, 17.07611814862171,
20.49924289326154, 24.919257384590637, 29.127405940762497,
32.582250133297954, 36.95640434973798, 40.65427372972747}

```

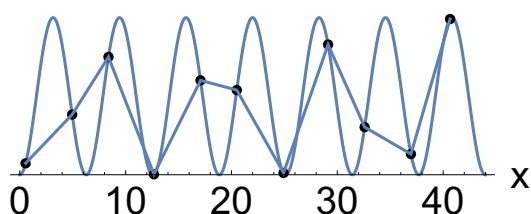
### Eigenvalues

```

{4.22324, 4.00338, 3.69782, 3.23665, 2.3951,
1.96915, 1.44508, 0.69132, -0.366231, 0.324153, 0.149684}

```

ENERGY SP 10.2202761178696



asym iMin

```

node149 = {0.6202135001, 5.0733759020, 8.5909896031,
12.8490860447, 17.3861467918, 20.9289680049,
25.3452086455, 29.9723217588, 33.6075128182,
38.0561230885, 42.8542088568 };

```

ENERGY 9.63546656203428

```

SetX = {0.6078731802545365, 5.062218179888715,
8.577131913262289, 12.841770402783279, 17.37834057400243,
20.919864835023123, 25.33920523206946, 29.963545918917536,
33.59488955707835, 38.0469300762053, 42.83981809603336` }

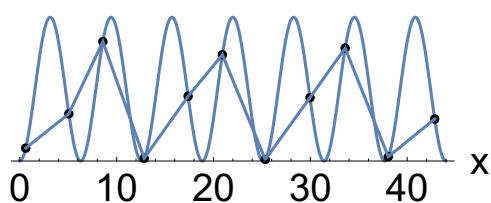
```

### Eigenvalues

```

{4.23696, 4.01263, 3.72687, 3.31245, 2.48053,
1.94245, 1.36705, 1.05653, 0.501228, 0.226739, 0.102148}

```

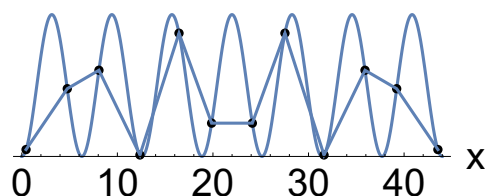


iMinGOLD

```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
Golden Mean  N = 12 global minimum start a0
ENERGY 10.0009233961834
SetX = {0.44423337884856884, 4.757221249749083, 8.071213918522881,
12.3617042955497, 16.448954218233492, 19.861184774849946,
24.121112375407172, 27.533342932023636, 31.620592854707414,
35.91108323173423, 39.22507590050803, 43.53806377140854`}
Eigenvalues
{4.205720496458257`, 4.031210786357035`, 3.697490798747027`,
3.163663638314424`, 3.056817421201447`, 2.221431012405365`,
1.6506078468724195`, 1.5370986008662495`, 0.6614170716554889`,
0.48635548377551713`, 0.23198572930328792`, 0.06427984251933529`}

```



```

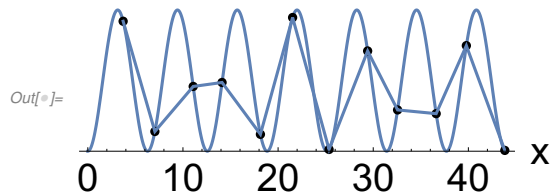
sp node184 energy = 11.43887 detHess - 5.333
node184 = {3.7135207883 × 7.0492736984 × 11.0783483430 ×
14.1108468042 × 18.1429989106 × 21.5259321358 ×
25.3574816101 × 29.4118843644 × 32.5586792527 ×
36.6152537126 × 39.7880584878 × 43.8296000278};
node224 = {};
node233 = {};
node250 = {};
node271 energy = 11.3130888 may be iMin detHess 2.0523898
node271 = {6.1135206213 × 9.8303541937 × 13.1526394510 ×
17.0281814913 × 19.9349542952 × 23.7262164493 ×
26.5309408598 × 30.3208073999 × 33.2216911275 ×
37.0950965863 × 40.4005501966 × 44.1320828751};
node284
node293
node 310
sp node359 energy = 11.4388916 detHess - 6.4781776
node359 = {6.4456608630 × 10.4866275193 × 13.6543359816 ×
17.7077285363 × 20.8517260027 × 24.9041156849 ×
28.7298663199 × 32.1156764341 × 36.1455129270 ×
39.1754972917 × 43.2010282591 × 46.5223783016};
min node540 energy = 10.000986 detHess 15.68851
node540 = {6.7354365887 × 11.0478175726 × 14.3615629261 ×
18.6502369693 × 22.7409091995 × 26.1501178356 ×
30.4100585691 × 33.8253723469 × 37.9091539939 ×
42.2014367653 × 45.5157019760 × 49.8292682097};

```

```

sp    node184 energy = 11.43887 detHess - 5.333
node184 = {3.7135207883, 7.0492736984, 11.0783483430,
14.1108468042, 18.1429989106, 21.5259321358,
25.3574816101, 29.4118843644, 32.5586792527,
36.6152537126, 39.7880584878, 43.8296000278};
SetX = node184;

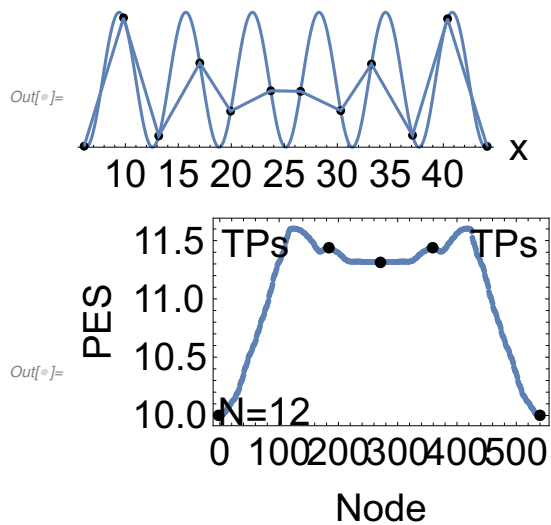
```



```

node271 energy = 11.3130888 iMin detHess 2.0523898
node271 = {6.1135206213, 9.8303541937, 13.1526394510,
17.0281814913, 19.9349542952, 23.7262164493,
26.5309408598, 30.3208073999, 33.2216911275,
37.0950965863, 40.4005501966, 44.1320828751};
SetX = node271;

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

```
Golden Mean N = 13 global minimum start a0
```

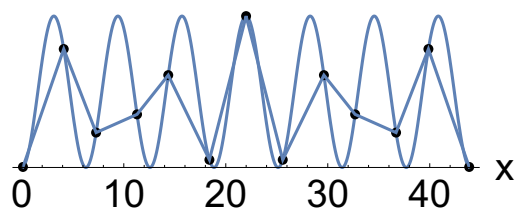
```
ENERGY 11.4290392848
```

```
SetX = {0.11454933424154722,
```

```
  4.112070424754573, 7.284435816680852, 11.298947230810931,  
  14.359124364488766, 18.394769869389656, 21.991145337162425,  
  25.587524048044614, 29.623170031366552, 32.683348112947584,  
  36.697860005450785, 39.87022526682599, 43.867747051089054`}
```

```
Eigenvalues
```

```
{4.195689031510844`, 4.025437539589961`, 3.74287507509994`, 3.442859601927684`,  
  2.7794935098345848`, 2.681432499494413`, 2.015090694804215`,  
  1.8866063973645237`, 0.9262165398660114`, 0.6932574115950282`,  
  0.2768496634648849`, 0.21515382622290247`, 0.008532761624697389`}
```



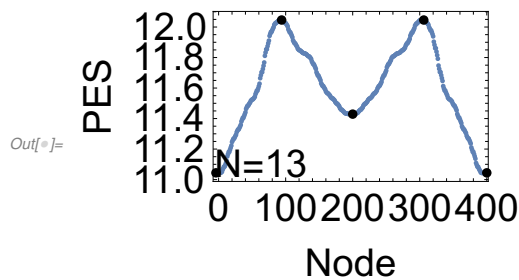
```
iMinA0gold
```



```

glob min  energy = 11.044349272191 detHess 47.4165970
nodexx = {0.5744844796 × 5.0012457810 × 8.4694369326 ×
12.7541387581 × 17.2255073177 × 20.6982934447 ×
25.1327019349 × 29.5670711313 × 33.0398503151 ×
37.5112185678 × 41.7957971556 × 45.2640084858 ×
49.6907249392};
sp  energy = 12.045962858 detHess - 13.87575
nodesp = {3.3879402455 × 6.9985941775 × 11.2651742070 ×
14.5678767030 × 18.7792488410 × 22.9203718066 ×
26.2603394511 × 30.5036919354 × 33.9561711749 ×
37.9744049474 × 42.2644677371 × 45.5653204309 ×
49.8660983810}
iMin  energy = 11.429040 detHess 1.98 is the a0 - minimum
nodeyy = {6.3967412021 × 10.3937466817 × 13.5664498663 ×
17.5806668532 × 20.6401127215 × 24.6755082831 ×
28.2694368600 × 31.8682624396 × 35.9041557227 ×
38.9650677871 × 42.9798747241 × 46.1519043039 ×
50.1499403735};
next SP  energy = 12.04629958 detHess - 14.358
nodesp2 = {6.7247707440 × 11.0194165862 × 14.3189982611 ×
18.5974566906 × 22.6177520142 × 26.0617558845 ×
30.2918949862 × 33.6344911241 × 37.7751743319 ×
41.9829885804 × 45.2777504322 × 49.5384722746 ×
53.1225396659};
final glob Min energy = 11.0442387 detHess 46.8881
nodeglobMin = {6.8301143871 × 11.2613899245 × 14.7277869044 ×
19.0247794808 × 23.4961003351 × 26.9695881599 ×
31.4078927900 × 35.8381637605 × 39.3102342615 ×
43.7814917758 × 48.0532907033 × 51.5238279955 ×
55.9459483642}

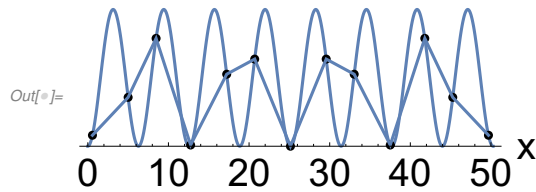
```



```

glob min energy = 11.044349272191 detHess 47.4165970
nodexx = {0.5744844796, 5.0012457810, 8.4694369326,
12.7541387581, 17.2255073177, 20.6982934447,
25.1327019349, 29.5670711313, 33.0398503151,
37.5112185678, 41.7957971556, 45.2640084858,
49.6907249392};
SetX = nodexx;

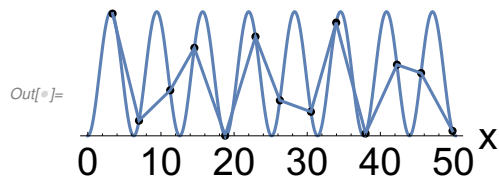
```



```

sp energy = 12.045962858 detHess -13.87575
nodesp = {3.3879402455, 6.9985941775, 11.2651742070,
14.5678767030, 18.7792488410, 22.9203718066,
26.2603394511, 30.5036919354, 33.9561711749,
37.9744049474, 42.2644677371, 45.5653204309,
49.8660983810};
SetX = nodesp;

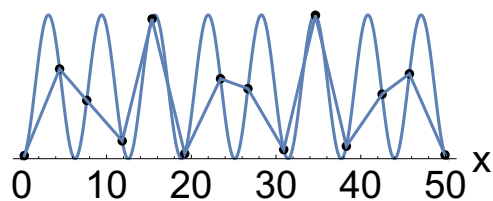
```



```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
Golden Mean N = 14 global minimum start a0
ENERGY 11.9560022576059
SetX = {0.29138688556237424, 4.461889887280961,
7.663604065568773, 11.847251101827439, 15.372175677148844,
19.226613129171028, 23.44923658125942, 26.67820489520044,
30.906852354461616, 34.6481307790091, 38.29892155695041,
42.51419774814747, 45.73474263547671, 49.93883462970751};
Eigenvalues
{4.216829499304101`, 4.06465821402738`, 3.851472762027946`,
3.568178576947212`, 2.9948630409956865`, 2.918919198016884`,
2.2177893806738687`, 1.783039863037493`, 1.6950889929378463`,
0.7971610653616383`, 0.5002752111956394`, 0.4242464599851025`,
0.08890630307955141`, 0.00033664333303820657`};

```

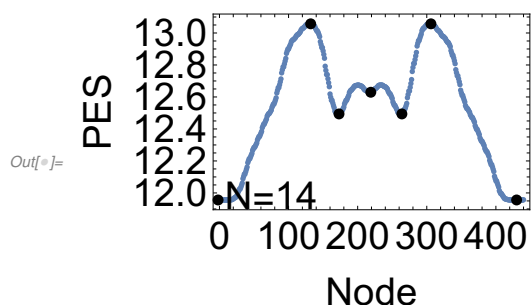


```
globMinA0asymGold
```

```

glob Min  node 6
sp 132  energy = 13.057294 detHess - 41.394
node132 = {0.5756348454 × 4.9981375499 × 8.4611893366 ×
12.7454855599 × 17.2079405315 × 20.6729021250 ×
25.1061421414 × 29.5127862070 × 32.9741500848 ×
37.4354349263 × 41.6360876263 × 45.1226084739 ×
49.5178927806 × 53.2333039122};
iMin 173 energy = 12.49387 detHess 53.2334
node173 = {0.5827647194 × 5.0269349220 × 8.5201681676 ×
12.7995854847 × 17.3101093530 × 20.8211245846 ×
25.2528997737 × 29.8045445735 × 33.3570128566 ×
37.8417035803 × 42.4685033268 × 46.0969272735 ×
50.5810825123 × 55.3756246965};
intermed - sp1 219 energy = 12.629426 detHess - 2.3329
node219 = {0.9897441237 × 5.7120540506 × 9.8937798676 ×
13.6235094926 × 18.2241923104 × 22.2394830180 ×
26.0089838868 × 30.5468242055 × 34.3209147363 ×
38.3294083060 × 42.9272861580 × 46.6552583601 ×
50.8348962631 × 55.5536726054};
iMin 264 energy = 12.493825 detHess 59.71029
node264 = {1.1703046557 × 5.9659870529 × 10.4497636367 ×
14.0788334665 × 18.7062023816 × 23.1907082440 ×
26.7433346671 × 31.2951692899 × 35.7265399395 ×
39.2375424884 × 43.7480213147 × 48.0263614766 ×
51.5198407061 × 55.9636697914};
306 energy 13.0572600 detHess - 37.1576
node306 = {3.3302207901 × 7.0448389184 × 11.4425177777 ×
14.9246348722 × 19.1197666437 × 23.5906743818 ×
27.0480737778 × 31.4555391429 × 35.8859550471 ×
39.3461460699 × 43.8211026016 × 48.0997527169 ×
51.5667601211 × 55.9839500616};
431 broad glob min energy 11.9560045 detHess - 0.1716049
node431 = {6.5922020464 × 10.7795604389 × 13.9901592392 ×
18.1899718536 × 21.7769962516 × 25.5765398426 ×
29.8054566200 × 33.0351602906 × 37.2636910984 ×
41.0704299814 × 44.6494586354 × 48.8472458884 ×
52.0566478269 × 56.2418666142};

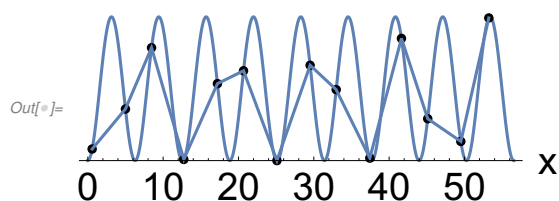
```



```

sp 132 energy = 13.057294 detHess - 41.394
node132 = {0.5756348454, 4.9981375499, 8.4611893366,
12.7454855599, 17.2079405315, 20.6729021250,
25.1061421414, 29.5127862070, 32.9741500848,
37.4354349263, 41.6360876263, 45.1226084739,
49.5178927806, 53.2333039122};
SetX = node132;

```

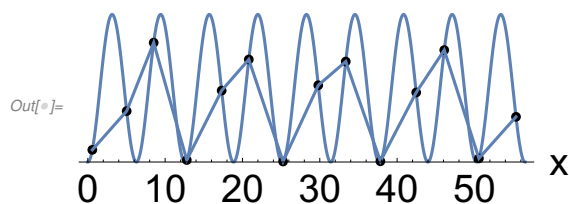


SP1gold

```

iMin 173 energy = 12.49387 detHess 53.2334
node173 = {0.5827647194, 5.0269349220, 8.5201681676,
12.7995854847, 17.3101093530, 20.8211245846,
25.2528997737, 29.8045445735, 33.3570128566,
37.8417035803, 42.4685033268, 46.0969272735,
50.5810825123, 55.3756246965};
SetX = node173;

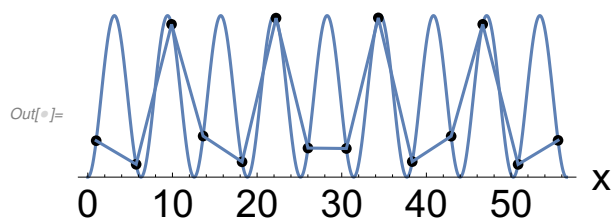
```



```

int - sp1 219 energy = 12.629426 detHess - 2.3329
node219 = {0.9897441237, 5.7120540506, 9.8937798676,
13.6235094926, 18.2241923104, 22.2394830180,
26.0089838868, 30.5468242055, 34.3209147363,
38.3294083060, 42.9272861580, 46.6552583601,
50.8348962631, 55.5536726054};
SetX = node219;

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

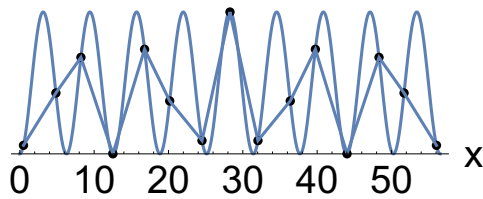
```
Golden Mean N = 15 global minimum start a0
```

```
ENERGY 12.787765773356734
```

```
SetX = {0.4955765979918887, 4.8543376359111745, 8.223156478959655,
12.52460073896556, 16.78428726865848, 20.16375454922497,
24.510480878338008, 28.274333882308298, 32.038186886278424,
36.384913215391435, 39.76438049595792, 44.02406702565078,
48.32551128565669, 51.69433012870514, 56.05309116662441`}
```

```
Eigenvalues
```

```
{4.2357354272633225`, 4.1284857076376795`, 3.921819656763376`,
3.6540105826790477`, 3.1981567527808035`, 3.148350032369317`,
2.3705669222626624`, 2.051156502730097`, 1.5452738416387206`,
1.4929091938512313`, 0.6948815585045612`, 0.5780619910429906`,
0.2776301915478438`, 0.1982617683443578`, 0.007171427893432543`}
```

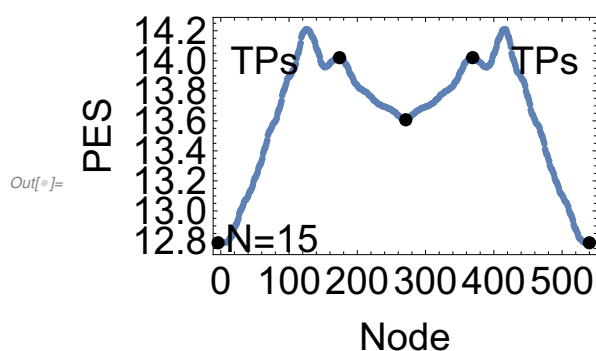


```
glob min node190 energy = 12.787765923308541
nodeglob = {0.4949596336 × 4.8536299478 × 8.2222581966 ×
12.5238356284 × 16.7828908989 × 20.1623904494 ×
24.5088019522 × 28.2709767188 × 32.0365086426 ×
36.3835493925 × 39.7629858673 × 44.0233025802 ×
48.3246132325 × 51.6936229026 × 56.0524744673};
```

```

node 174 energy = 14.0209678 SP detHess - 17.9425
node174 = {3.4940512713 × 7.0281735708 × 11.2402590535 ×
14.4821307974 × 18.6650902170 × 22.6646283076 ×
26.0404566866 × 30.2043846183 × 33.4321533340 ×
37.5623473317 × 41.5562027721 × 44.8940646328 ×
49.0225137844 × 52.2042188916 × 56.3189942548};
271 iMin energy = 13.607066 detHess 15.71014
node271 = {6.3097597924 × 10.2257903234 × 13.4237598112 ×
17.3778658951 × 20.3368789901 × 24.2924102151 ×
27.5030774215 × 31.4107813440 × 35.3133400972 ×
38.5300125683 × 42.4852239890 × 45.4431517307 ×
49.3950419639 × 52.5823192922 × 56.5039786905};
369 SP energy = 14.02091338 detHess - 17.97276
node369 = {6.5266089524 × 10.6408894984 × 13.8174140378 ×
17.9432516977 × 21.2818592701 × 25.2717614928 ×
29.4002366136 × 32.6260552708 × 36.7875353683 ×
40.1585451519 × 44.1600255444 × 48.3383001454 ×
51.5794109130 × 55.7877121280 × 59.3063995329};
540 globMin energy = 12.7877670 detHess 4.11108
node540 = {6.7801380128 × 11.1391005839 × 14.5083453822 ×
18.8094907371 × 23.0705816257 × 26.4499820684 ×
30.7974091689 × 34.5650084301 × 38.3251185206 ×
42.6711419661 × 46.0506832400 × 50.3089600554 ×
54.6107007723 × 57.9790947447 × 62.3376531063};

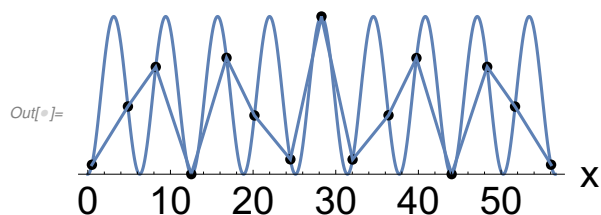
```



```

glob min node190 energy = 12.787765923308541
nodeglob = {0.4949596336, 4.8536299478, 8.2222581966,
12.5238356284, 16.7828908989, 20.1623904494,
24.5088019522, 28.2709767188, 32.0365086426,
36.3835493925, 39.7629858673, 44.0233025802,
48.3246132325, 51.6936229026, 56.0524744673};
SetX = nodeglob;

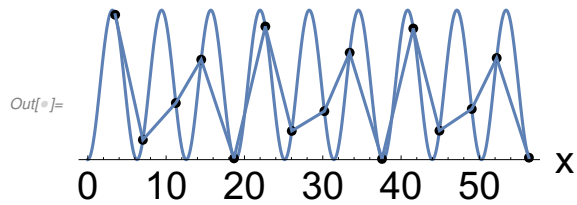
```



```

node 174 energy = 14.0209678 SP detHess - 17.9425
node174 = {3.4940512713, 7.0281735708, 11.2402590535,
14.4821307974, 18.6650902170, 22.6646283076,
26.0404566866, 30.2043846183, 33.4321533340,
37.5623473317, 41.5562027721, 44.8940646328,
49.0225137844, 52.2042188916, 56.3189942548};
SetX = node174;

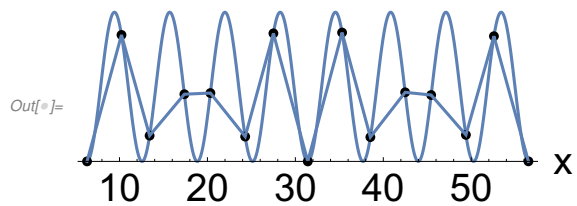
```



```

271 iMin energy = 13.60706699 detHess 15.71014
node271 = {6.3097597924, 10.2257903234, 13.4237598112,
17.3778658951, 20.3368789901, 24.2924102151,
27.5030774215, 31.4107813440, 35.3133400972,
38.5300125683, 42.4852239890, 45.4431517307,
49.3950419639, 52.5823192922, 56.5039786905};
SetX = node271;

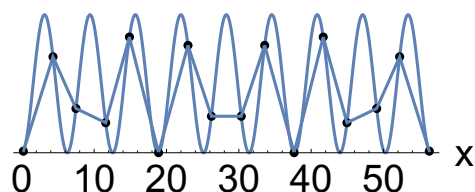
```



```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
Golden Mean    N = 16 global minimum start a0
ENERGY 13.956524417294025
SetX = {0.21479748419416025,
  4.311169132410752, 7.486955502965215, 11.596140491759924,
  14.88030970086136, 18.900824700399717, 22.97258602185831,
  26.213050140871154, 30.33561762374512, 33.576081742757964,
  37.64784306421655, 41.66835806375491, 44.95252727285635,
  49.06171226165106, 52.23749863220552, 56.33387028042211`}
Eigenvalues
{4.225827487338892`, 4.114276974287992`,
  3.9155051703798627`, 3.713920276435871`, 3.443539819242351`,
  2.8696349772048597`, 2.823419017289544`, 2.2165885546557536`,
  1.8677616470798404`, 1.798109410730072`, 0.8970452030393039`,
  0.6550001936553899`, 0.434706955211921`, 0.31848061320267607`,
  0.13993193825191386`, 0.061726237661016634`}

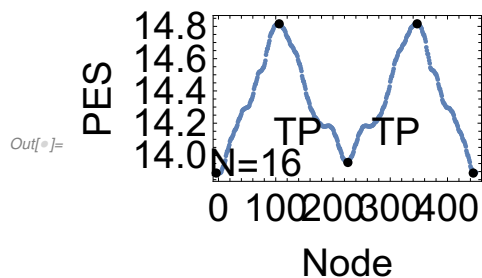
```



```

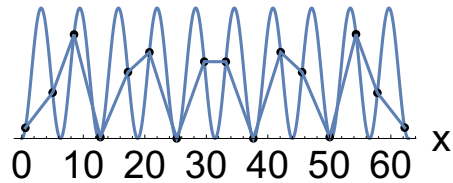
SP   node124   detHess - 15.9769 energy = 14.816027
node124 = {0.4675206956 × 4.8046106960 × 8.1459501058 ×
12.4449686460 × 16.6228832107 × 20.0082840092 ×
24.3099792502 × 27.8786471723 × 31.8327570234 ×
36.1917312375 × 39.5527155547 × 43.8739756873 ×
48.0871260651 × 51.4792331071 × 55.8082736189 ×
59.4627352073};
gMin   node226   detHess 122.8697 energy = 13.890949
node226 = {0.5791902368, 5.0126034706, 8.4907436232,
12.7729090513, 17.2601476215, 20.7475593888,
25.1819148166, 29.6654240175, 33.1650369676,
37.6487940377, 42.0822545328, 45.5694287168,
50.0564694842, 54.3360157957, 57.8145759101,
62.2470165498};
next SP node329
next iMin node449
next SP node570

```





```
SetX = {0.5791902368, 5.0126034706, 8.4907436232,
12.7729090513, 17.2601476215, 20.7475593888,
25.1819148166, 29.6654240175, 33.1650369676,
37.6487940377, 42.0822545328, 45.5694287168,
50.0564694842, 54.3360157957, 57.8145759101,
62.2470165498};
```



GlobMinGold

```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

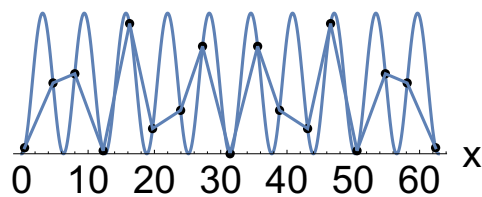
```
N = 17 GOLD global minimum start a0
```

```
ENERGY 14.65090446062042
```

```
SetX = {0.4168075475229283, 4.70487301204077,
7.9929667213157245, 12.271417540867684, 16.2591734099999978,
19.723210757402736, 23.953928666894612, 27.260493540402432,
31.41592653589793, 35.57135953139343, 38.87792440490125,
43.10864231439312, 46.57267966179588, 50.56043553092818,
54.83888635048014, 58.12698005975509, 62.415045524272934`}
```

Eigenvalues

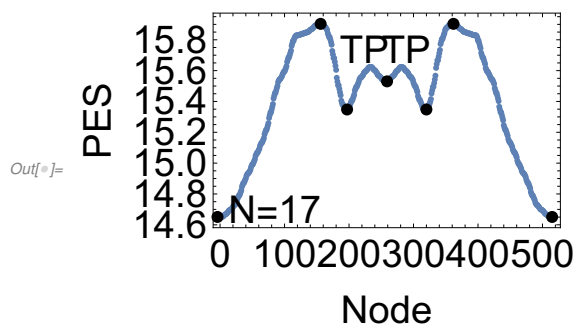
```
{4.237242632942053`, 4.138668385289335`,
4.002802742754338`, 3.7693467046244433`, 3.5291125671285015`,
3.09068441836297`, 3.0568518025015967`, 2.345616152167634`,
2.0571119845109553`, 1.6412471357217822`, 1.6043449978460287`,
0.8119734234801051`, 0.5670760710708402`, 0.4769820054469361`,
0.27536353739001396`, 0.09418480499619376`, 0.038796693945076594`}
```



```

SP node156 energy = 15.903422 detHess - 105.065
0.5900046673 × 5.0199354728 × 8.4967871118
12.7740559359 × 17.2575202762 × 20.7412101623
25.1738652462 × 29.6476327572 × 33.1408395802
37.6221939099 × 42.0267061296 × 45.5043428317
49.9807914563 × 54.1763791775 × 57.6763314466
62.0796966248 × 65.7998467808
iMin node197 energy = 15.347833 detHess 162.09117
0.5741460236 × 5.0152744343 × 8.5019230398
12.7858995932 × 17.2876460776 × 20.7894320449
25.2238777244 × 29.7493337908 × 33.2793748261
37.7668980340 × 42.3221555323 × 45.8814016615
50.3872370028 × 55.0145262941 × 58.6424872953
63.1367613460 × 67.9312410785
SP? node259 energy = 15.530262 detHess - 6.2809564
1.0720395943 × 5.8331686595 × 10.1593172003
13.8152204629 × 18.4197450488 × 22.6075707499
26.2172769180 × 30.7110696126 × 34.5569374533
38.4033870301 × 42.8973182403 × 46.5069558836
50.6951305439 × 55.2998561035 × 58.9559724235
63.2821475418 × 68.0435533301
iMin node320
SP node362
gMin node514

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

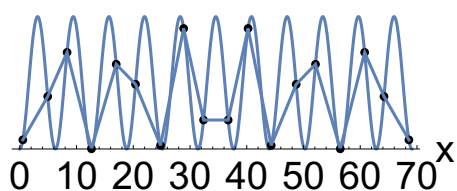
N = 18 GOLD global minimum start a0

ENERGY 15.594376106889

```
SetX = {0.5309540863148358, 4.920532443922976, 8.331694524853503,
12.63090530398162, 16.99460591451224, 20.398407258983763,
24.80196775605706, 28.880753631626927, 32.389610132523806,
36.725429141989984, 40.23428619582946, 44.31307126010057,
48.716631567424166, 52.120432814422344, 56.48413320895774,
60.78334399781361, 64.19450600576563, 68.58408432145598 }
```

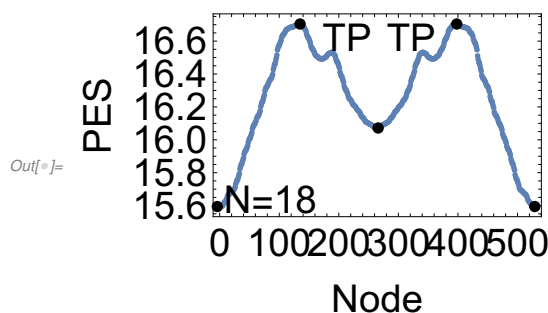
Eigenvalues

```
{4.254800217911386`, 4.183897289362431`, 4.033600208836561`,
3.861539532458626`, 3.6208609312978086`, 3.229778512497761`,
3.2054524970998854`, 2.4674167592723033`, 2.2074413477251316`,
1.9326628417202738`, 1.4806356531925855`, 1.4546514955793415`,
0.72642258616546`, 0.6361197864926851`, 0.3506960110233271`,
0.23817488277545293`, 0.15518055574874748`, 0.030848908841657814` }
```



localMinA0gold

```
SP node135 energy = 16.70409 detHess - 25.18286
3.4769904101 × 7.0318487239 × 11.2673672262
14.5395946140 × 18.7319349022 × 22.8069251922
26.1536574460 × 30.3529768810 × 33.6785026268
37.7741402806 × 41.9447359994 × 45.2223029314
49.4456557405 × 52.9379809483 × 56.8823846400
61.1543454351 × 64.4319944811 × 68.7092129911
iMin node266 energy = 16.071785019 detHess 17.28031
6.4521927171 × 10.4989456994 × 13.6665047671
17.7253320389 × 20.8822266312 × 24.9343400198
28.7893512525 × 32.1518125181 × 36.1855179251
39.2208589437 × 43.2549972901 × 46.6242805050
50.4726463501 × 54.5266974599 × 57.6808127262
61.7402532707 × 64.9123281494 × 68.9573043217
SP node398
gMin node528 15.594376106889095
```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

N = 19 GOLD global minimum start a0 ?

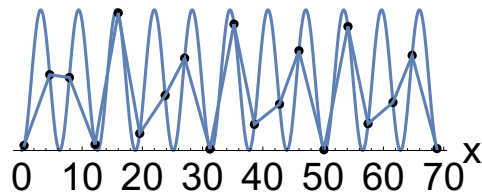
ENERGY 16.627932008356

SetX = {0.38007234165247167,

4.634282068680342, 7.89154059008427, 12.148093856809124,  
15.998460748753523, 19.562398743063344, 23.780323759016067,  
27.021998826767387, 31.213392221273885, 35.203633128584805,  
38.59178582209451, 42.75869051758399, 45.98526256326609,  
50.11989399230997, 54.10945072697687, 57.45297462265234,  
61.58249534060148, 64.76323415663065, 68.87966364114814`}

Eigenvalues

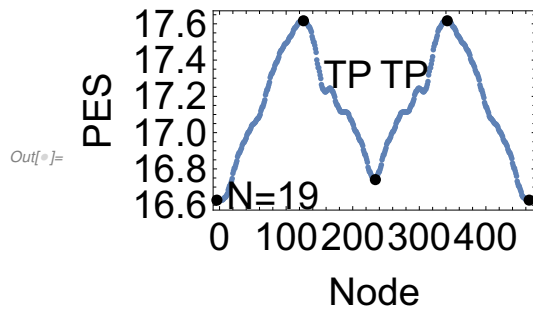
{4.239721862465512`, 4.160394714042206`, 4.032983507409244`, 3.863857801848241`,  
3.66538158291058`, 3.445541107153643`, 3.0321774450408667`,  
2.872044921575361`, 2.327881963170809`, 2.0761109304591803`,  
1.8045685412941794`, 1.6637093230134683`, 0.8837711094223578`,  
0.6898763531062734`, 0.4887504368484666`, 0.41280347238572596`,  
0.18269770821373274`, 0.07762577297528155`, 0.01865417435926675`}



```

SP node126 detHess - 37.01668 energy = 17.61679
0.5337595636 × 4.9173228928 × 8.3218117863
12.6188495627 × 16.9683422025 × 20.3656286844
24.7614182058 × 28.7943591217 × 32.3303979966
36.6586770495 × 40.1243318554 × 44.2466399321
48.6302229442 × 52.0158829881 × 56.3854575069
60.5925453915 × 64.0148880504 × 68.3629885604
72.0279519140
iMin node 234 energy = 16.74098 detHess 327.83066
0.5846443031 × 5.0199210849 × 8.5021143446
12.7815200729 × 17.2744192444 × 20.7673278351
25.2006419056 × 29.7018044888 × 33.2132206324
37.6990956283 × 42.1849544095 × 45.6963652637
50.1975302599 × 54.6307953413 × 58.1236891256
62.6165739846 × 66.8958387621 × 70.3780544488
74.8132785106
SP node342 gMin node465

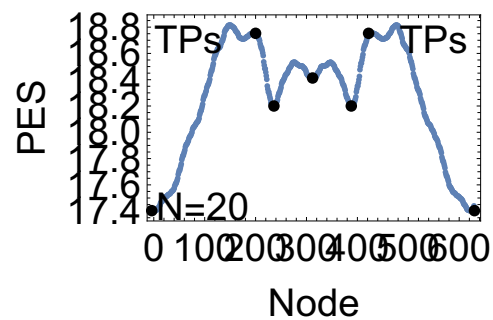
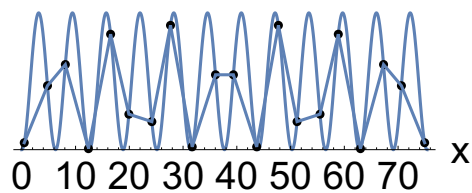
```



```

## ## ## ## # == GOLD ## ## ## ## # ==
N = 20 GOLD mean minimum
ENERGY 17.4037994390911
SetX = {0.45469632203000865, 4.777107910942008,
 8.10161303894784, 12.39561386998834, 16.51968656475084,
 19.91828495076324, 24.193472908850747, 27.66153451884033,
 31.70475583403316, 36.032807360740236, 39.36541632541482,
 43.69346785212189, 47.736689167314736, 51.204750777304305,
 55.479938735391805, 58.87853712140421, 63.002609816166704,
 67.2966106472072, 70.62111577521303, 74.94352736412503`}
Eigenvalues
{4.25294042396744`, 4.179026587503281`,
 4.083636784038842`, 3.923941514519277`, 3.7178340097926252`,
 3.5405944902626114`, 3.128566207957222`, 3.1126552107529486`,
 2.434817961765764`, 2.200781739812104`, 1.954692686835353`,
 1.5812329019335332`, 1.562719467602941`, 0.8033132685280047`,
 0.6093073253135363`, 0.5400038803957362`, 0.29961029372473463`,
 0.21802694490328267`, 0.0878332411799903`, 0.032381863567672454`}

```



by 145 no SP but TP

by 313 iMinSP energy = 18.41342 detHess - 9.078

SP by 171 energy = 18.7530 detHess - 312.294

SP by 236 min ? energy = 18.19993 detHess 464.619

```
node171 = { 0.5924427509, 5.0338181882, 8.5162545752,
12.7945793383, 17.2882515504, 20.7709603182,
25.2126898253, 29.7163583960, 33.2215064325,
37.7030598682, 42.1816078955, 45.6932576565,
50.2016096077, 54.6336821916, 58.0982170290,
62.5920019158, 66.8038468610, 70.2858048991,
74.7076967103, 78.4623465330};
```

```
node236 = {0.5911923462, 5.0278150377, 8.5137734361,
12.7898516985, 17.2875554360, 20.7852978567,
25.2171834522, 29.7334109547, 33.2558725648,
37.7423315241, 42.2719967104, 45.8113768247,
50.3175868108, 54.8758775775, 58.4393652105,
62.9521193616, 67.5848500905, 71.2184052125,
75.7134650791, 80.5185709233 };
```

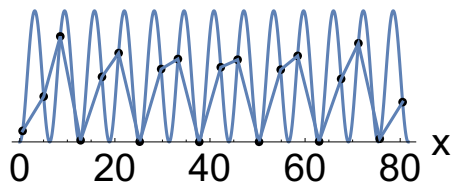
Setxx = node236;

ENERGY 18.1999220293

```
SetX = {0.5872621232554014, 5.024568128068954,
8.510207591456833, 12.788147583836901, 17.286050993822986,
20.783980985941568, 25.21652333197023, 29.732749798393677,
33.255284300109395, 37.74197241067971, 42.27150796737855,
45.81082653100568, 50.31711537684943, 54.87501420329491,
58.43819817305852, 62.95101501578226, 67.58271199460549,
71.21514885040946, 75.71073929652204, 80.5137831115024`}
```

Eigenvalues

```
{4.29619, 4.22705, 4.11712, 3.97371, 3.81572, 3.70897,
3.29277, 2.7053, 2.46955, 2.19138, 1.90365, 1.6311, 1.37376,
1.035, 0.711012, 0.524629, 0.360431, 0.233285, 0.148883, 0.113677}
```



Setxx = node171;

```
SetX = {0.5842734754122427, 5.019089077181542,
8.50056963206795, 12.780194244764516, 17.27201685308218,
20.763862193596275, 25.19728587337414, 29.695209391523733,
33.204350001963945, 37.689903142372906, 42.16624771222659,
45.672516381914136, 50.17166260746258, 54.57712655876297,
58.06181984112474, 62.544852153698166, 66.74480737472025,
70.2476504601797, 74.65601711842947, 78.38846802701879}
```

## Eigenvalues

```
{4.28931, 4.21613, 4.10668, 3.96637, 3.80936, 3.66345, 3.28867,
 2.65556, 2.424, 2.17551, 1.92977, 1.69039, 1.38075, 0.771271,
 0.585627, 0.402983, -0.371157, 0.257907, 0.157676, 0.115607}
```

```
ENERGY SP 18.75302584773542`
```

```
18.75302584773542 - 17.403799439091124`
```

```
barrier 1.349226408644295`
```

```
1.34923
```

```
node312 = {1.1138628812, 5.8964302482, 10.3018124719,
13.9383486675, 18.5551855293, 22.8818850087,
26.4310494312, 30.9433181065, 35.0003764468,
38.6289119559, 43.0589478906, 46.6913576224,
50.7429384839, 55.2540405374, 58.8030355164,
63.1273525728, 67.7428873666, 71.3780873475,
75.7830974976, 80.5635498301};
```

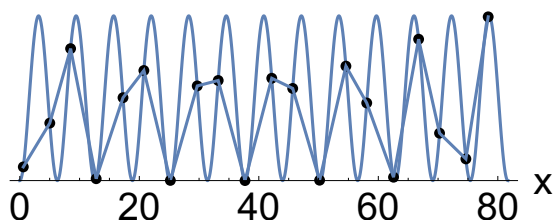
```
Setxx = node171;
```

```
SetX = {0.5842734754122427, 5.019089077181542,
 8.50056963206795, 12.780194244764516, 17.27201685308218,
 20.763862193596275, 25.19728587337414, 29.695209391523733,
 33.204350001963945, 37.689903142372906, 42.16624771222659,
 45.672516381914136, 50.17166260746258, 54.57712655876297,
 58.06181984112474, 62.544852153698166, 66.74480737472025,
 70.2476504601797, 74.65601711842947, 78.38846802701879`}
```

## Eigenvalues

```
{4.28931, 4.21613, 4.10668, 3.96637, 3.80936, 3.66345, 3.28867,
 2.65556, 2.424, 2.17551, 1.92977, 1.69039, 1.38075, 0.771271,
 0.585627, 0.402983, -0.371157, 0.257907, 0.157676, 0.115607}
```

```
SP ENERGY 18.75302584773542`
```



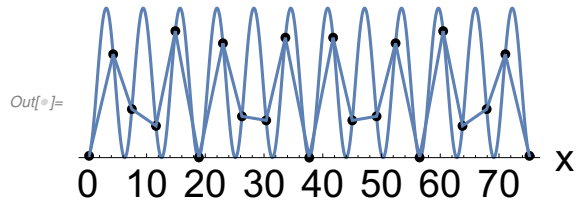
```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

```
N = 21 GOLD a0 - min is iMin
```

```
ENERGY 18.622254529314
```



```
SetX = {0.21859032454295205, 4.318666115038635, 7.495254680957016,
  11.60818771755767, 14.902972793597193, 18.91858200107785,
  23.003162656955617, 26.23984200475468, 30.3709271627536,
  33.63708810662635, 37.69911177335002, 41.76113528875638,
  45.02729614460245, 49.158381112983676, 52.39506009188999,
  56.479640876247366, 60.49524965880761, 63.790035211279275,
  67.90296842440267, 71.07955704589766, 75.17963311062014`}
```

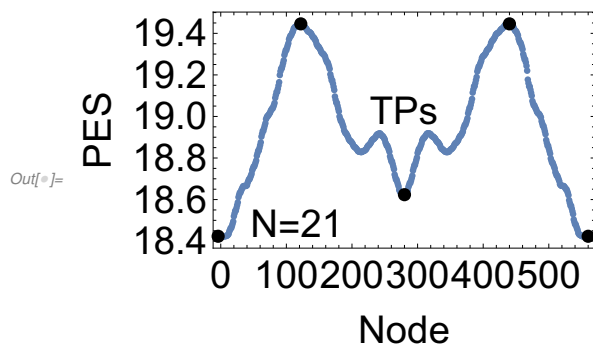


```
gMin node280 energy 18.4233522904 detHess - 3.39563 ?
  0.5511358269 × 4.9574028500 × 8.3935359121
12.6876067321 × 17.1026168959 × 20.5331001168
24.9572340277 × 29.2067603691 × 32.6532184944
37.0445775906 × 40.8271468697 × 44.6232733604
49.0173780218 × 52.4630974821 × 56.7187146063
61.1435602457 × 64.5753006610 × 68.9921738333
73.2864913477 × 76.7235817928 × 81.1307031775
```

```

SP node122 energy = 19.4456571 detHess - 25.984
3.4287454128 × 7.0264006262 × 11.3007146735
14.6212239346 × 18.8268473890 × 23.0097642624
26.3412984323 × 30.6079382949 × 34.1516795526
38.0902111439 × 42.4099476738 × 45.7296854098
50.0338712686 × 54.1085111401 × 57.5378356533
61.8027292848 × 65.2107753470 × 69.3096759821
73.6019876110 × 76.9196033376 × 81.2359983088
iMin node280 energy = 18.623458 detHess 96.71776
6.4964424665 × 10.5963373010 × 13.7748742783
17.8884979742 × 21.1823238065 × 25.1996259929
29.2837630858 × 32.5213720562 × 36.6526452276
39.9182586945 × 43.9809531165 × 48.0423035052
51.3090142861 × 55.4399117951 × 58.6756644838
62.7606844619 × 66.7745958927 × 70.0703503780
74.1825987773 × 77.3572602848 × 81.4574984481
SP node440 energy = 19.445133 detHess - 38.299
6.7262544244 × 11.0430255627 × 14.3609223015
18.6538900794 × 22.7524381423 × 26.1611306085
30.4262917746 × 33.8556274207 × 37.9306265049
42.2350776261 × 45.5550509957 × 49.8750224494
53.8143800626 × 57.3576014775 × 61.6243744518
64.9564244937 × 69.1390197935 × 73.3455942094
76.6660217028 × 80.9408953312 × 84.5411018137
gMin node558 energy = 18.4242102 detHess - 2.192729826
6.8342540982 × 11.2406593885 × 14.6769479991
18.9710578365 × 23.3863708598 × 26.8170574518
31.2413075769 × 35.4918247983 × 38.9381554778
43.3299591004 × 47.1147166895 × 50.9086472643
55.3023087636 × 58.7481400196 × 63.0027781454
67.4275102863 × 70.8590478467 × 75.2756214805
79.5698998230 × 83.0068362006 × 87.4138203047

```



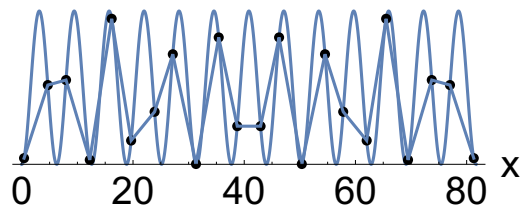
```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

N = 22 GOLD a0 - min

ENERGY 19.31062779967

SetX = {0.40286345820666036,

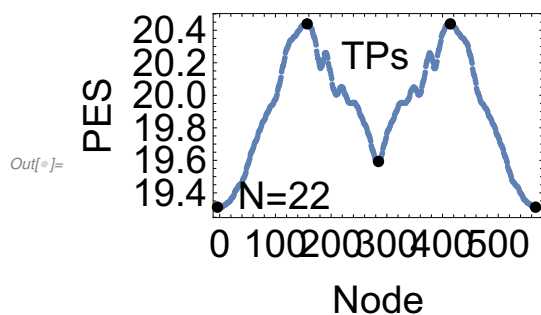
4.6781396975285015, 7.954002386208983, 12.224867168186766,  
16.16082785456306, 19.659245386270882, 23.88173594384942,  
27.154925372846805, 31.32795738453584, 35.413133660232845,  
38.74333593519728, 42.93807305813737, 46.268275333101826,  
50.353451608798814, 54.52648362048785, 57.79967304948523,  
62.022163607063774, 65.52058113877162, 69.45654182514788,  
73.72740660712566, 77.00326929580613, 81.27854553512798`}



```

SP node157 energy = 20.4393249 detHess - 42.01
0.5298776655 × 4.9290934409 × 8.3516978834
12.6529774866 × 17.0407557333 × 20.4567234533
24.8720298139 × 29.0295681836 × 32.5016472684
36.8583660572 × 40.4699441488 × 44.4438464609
48.8630846103 × 52.2964683078 × 56.6258203481
61.0322484527 × 64.4647391711 × 68.8953029388
73.1078952743 × 76.5683734271 × 80.9496605889
84.6627762694
iMin node285 energy = 19.592990 detHess 921.293
0.5821588191 × 5.0189038998 × 8.5022580423
12.7827378946 × 17.2779007759 × 20.7730640260
25.2066666735 × 29.7141274507 × 33.2301568245
37.7167021859 × 42.2208369830 × 45.7430931335
50.2473535841 × 54.7334861542 × 58.2493324794
62.7567577511 × 67.1891582630 × 70.6839414138
75.1787227723 × 79.4557615917 × 82.9396617726
87.3751165126
SP node414 energy = 20.4402757 detHess - 48.437
3.3009996513 × 7.0145114420 × 11.3958804827
14.8563078106 × 19.0691070876 × 23.4996979499
26.9322255283 × 31.3387177762 × 35.6680779510
39.1014911202 × 43.5207556286 × 47.4946912737
51.1062643708 × 55.4630022584 × 58.9351261940
63.0926365438 × 67.5079845059 × 70.9239897009
75.3117697797 × 79.6132036087 × 83.0358156589
87.4351066794
gMin node567 energy = 19.311949 detHess 36.7131
6.6848660166 × 10.9601528846 × 14.2360670249
18.5070945370 × 22.4423154877 × 25.9415204576
30.1641703427 × 33.4372833051 × 37.6105994554
41.6955187468 × 45.0259890277 × 49.2207265574
52.5506620891 × 56.6360950345 × 60.8088439170
64.0821104047 × 68.3044426233 × 71.8020770234
75.7387730774 × 80.0094741145 × 83.2852852967
87.5605493863

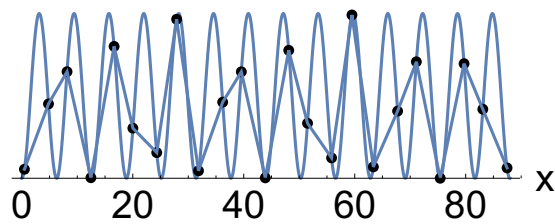
```



```

-----
N = 23 GOLD a0 - min
ENERGY 20.19598034456
SetX = {0.47193733568116153, 4.809772195929899,
 8.152344862677086, 12.450736632131, 16.633752050923583,
20.017672313378224, 24.321606692288608, 27.90047230647405,
31.84455086678877, 36.204249548724704, 39.56682984623406,
43.885651825275296, 48.10797912464719, 51.49753806692818,
55.83027090793487, 59.504825385126544, 63.363754137047195,
67.72985566746277, 71.11313410360837, 75.40650075846429,
79.70814452353126, 83.0896911972472, 87.45806148657611`}
Eigenvalues
{4.261648272564124`, 4.2072578872287245`,
 4.135383270334374`, 4.010605322621356`, 3.868533796825686`,
 3.691067844959803`, 3.5407847213569172`, 3.186224451806015`,
 3.142219612662821`, 2.4926595469266015`, 2.295807869172041`,
 2.1021811474502266`, 1.8869424291688883`, 1.5488383503277152`,
 1.5018120831016084`, 0.7996058330341774`, 0.6489566071340478`,
 0.5876492384478865`, 0.3505693194532389`, 0.24318261387467505`,
 0.20119366182619233`, 0.04107970976295971`, 0.004838808122645013`}

```



GlobMinA0gold

SP node262 energy = 21.367377 detHess = 51.20317

3.4740008911 × 7.0256303289 × 11.2533512328

14.5141130428 × 18.7046679095 × 22.7508411601

26.1083158237 × 30.2938146830 × 33.5782950109

37.6928403093 × 41.8011141151 × 45.0899614970

49.2734665472 × 52.6198412088 × 56.6746195228

60.8550168458 × 64.1167220084 × 68.3378276682

71.8576395856 × 75.7659407085 × 80.0337278404

83.3044691549 × 87.5738450260

iMin node437 energy = 20.7278343 detHess 4.3309

6.4652894004 × 10.5311244097 × 13.7028913013

17.7818332502 × 20.9846703693 × 25.0324609812

28.9801393330 × 32.2791706250 × 36.3381570536

39.4190795466 × 43.4888966060 × 47.0850900922

50.7200735558 × 54.7941519961 × 57.8850594375

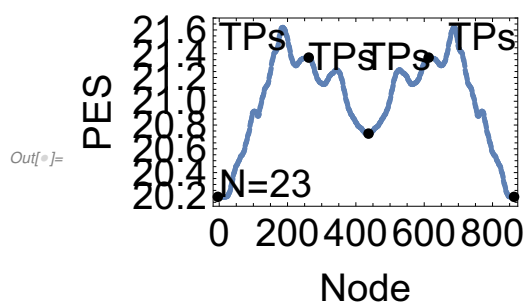
61.9486196700 × 65.2393848905 × 69.2000402695

73.2455952149 × 76.4556929728 × 80.5369062257

83.7076148691 × 87.7764044840

SP node 613

gMin node863

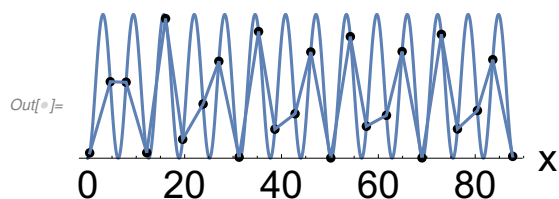


### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

N = 24 GOLD a0 - min

ENERGY 21.2962447102976

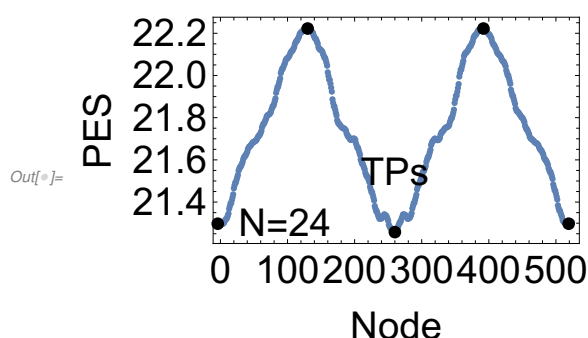
SetX = {0.38723254779519, 4.648081845414, 7.910998266673147,  
12.17228964744364, 16.04962142113154, 19.591903245440367,  
23.81020458809997, 27.0591645247381, 31.245552907378666,  
35.26239048310547, 38.6312921902483, 42.80311551059033, 46.05064467549475,  
50.176927882430185, 54.21477225497958, 57.5299191700448,  
61.67626010660711, 64.90756684196874, 69.01408793985016, 73.0198298276108,  
76.33433531085576, 80.45409984243632, 83.63227808265512, 87.7390940357913}



```

SP node130 energy = 22.2224914 detHess - 44.0473
0.4639442894 × 4.7942479409 × 8.1279001665
12.4242706962 × 16.5790190477 × 19.9687580936
24.2582496955 × 27.7805238200 × 31.7767821518
36.1261153560 × 39.4754509805 × 43.8037369469
47.9544100599 × 51.3668007934 × 55.6709961044
59.2059381288 × 63.2064888520 × 67.5729731707
70.9398701995 × 75.2746733662 × 79.4862402993
82.8864770463 × 87.2205773500 × 90.8774287986
gMin node260 energy = 21.2576329776 detHess 132.2831288195
0.5526829625 × 4.9732559329 × 8.4276621651
12.7219775420 × 17.1712726412 × 20.6263389035
25.0602648231 × 29.4217777715 × 32.8715738995
37.3147477078 × 41.3829517736 × 44.9350936387
49.3022744959 × 52.8484281732 × 56.9246211736
61.3679736908 × 64.8170363821 × 69.1814623840
73.6122635562 × 77.0661232942 × 81.5152722120
85.7990475632 × 89.2545345442 × 93.6708400281
SP node392 energy = 22.22229689 detHess - 53.62541
3.3724564236 × 7.0282903003 × 11.3621731628
14.7625041754 × 18.9736009465 × 23.3084248702
26.6752132430 × 31.0416005092 × 35.0423424667
38.5770324143 × 42.8811346649 × 46.2935028590
50.4440635086 × 54.7722575280 × 58.1215157193
62.4707718060 × 66.4667419123 × 69.9891803583
74.2786120355 × 77.6681125355 × 81.8230395207
86.1191240087 × 89.4526948164 × 93.7828482737
iMin node519 energy = 21.29753087 detHess 48.694609055
6.5170344014 × 10.6241584173 × 13.7994680226
17.9182971777 × 21.2347545074 × 25.2375150994
29.3448579735 × 32.5747488350 × 36.7209718670
40.0377350398 × 44.0739199783 × 48.2015996070
51.4484031755 × 55.6209213851 × 58.9931689792
63.0074069486 × 67.1962984461 × 70.4451140844
74.6650961518 × 78.2158812910 × 82.0849658333
86.3467423143 × 89.6096257086 × 93.8697549444

```

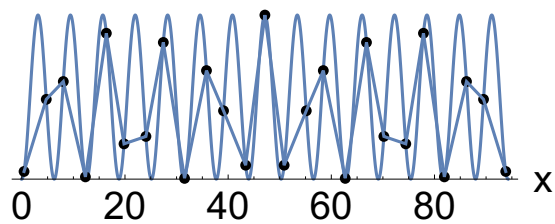


```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

```
N = 25 GOLD a0 - min
```

```
ENERGY 22.046813548979
```

```
SetX = {0.4351605946280056, 4.739938706468088, 8.045096288009834,  
12.33204698233575, 16.3868125219161, 19.813680242330847,  
24.062097937520548, 27.43300645026961, 31.549443438210147,  
35.799000986202685, 39.102294291193445, 43.3915732465719,  
47.12388980384707, 50.85620636112207, 55.14548531650049,  
58.448778621491236, 62.69833616948373, 66.8147731574243,  
70.18568167017331, 74.434099365363, 77.86096708577776,  
81.91573262535807, 86.20268331968398, 89.50784090122573, 93.812619013065}
```

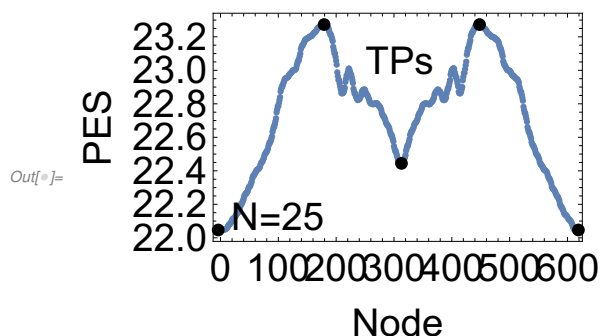




```

SP node179 energy = 23.2731338 detHess - 112.651
0.5726477738 × 4.9881620930 × 8.4414614386
12.7271009615 × 17.1727796670 × 20.6240689907
25.0546797218 × 29.4073082011 × 32.8542594711
37.2924502869 × 41.3350957467 × 44.9032453242
49.2675705867 × 52.7915549193 × 56.8929225748
61.3317855340 × 64.7731487314 × 69.1466585918
73.5517833959 × 76.9946580683 × 81.4372041038
85.6379652574 × 89.1110257713 × 93.4953867175
97.1963600056
iMin node 313 energy = 22.44439977270 detHess 2522.72189
0.5731109693 × 5.0118303632 × 8.4950483334
12.7797245794 × 17.2761398282 × 20.7725585068
25.2075910943 × 29.7174036759 × 33.2353622067
37.7225688962 × 42.2332304877 × 45.7597401966
50.2649743450 × 54.7697003810 × 58.2960158768
62.8067865476 × 67.2924933192 × 70.8097217931
75.3192860724 × 79.7499946909 × 83.2450243595
87.7400282463 × 92.0123487996 × 95.4975270720
99.9316103040
SP node448 energy = 23.2733744 detHess - 129.096160
3.2945900842 × 7.0147246143 × 11.4028750411
14.8728320425 × 19.0841736249 × 23.5279863869
26.9723756838 × 31.3808451342 × 35.7542403783
39.1967896469 × 43.6366669471 × 47.7377545686
51.2628112693 × 55.6278927055 × 59.1969032142
63.2394991247 × 67.6785444071 × 71.1265947030
75.4790726881 × 79.9123116250 × 83.3651478676
87.8116128777 × 92.1056924792 × 95.5585683647
99.9778322823
gMin 22.046813548979394`
6.7147293061 × 11.0191741342 × 14.3238974256
18.6112371794 × 22.6625077114 × 26.0917275099
30.3395570678 × 33.7071458001 × 37.8262613159
42.0721839773 × 45.3751243702 × 49.6622700167
53.3821247661 × 57.1269272718 × 61.4182970278
64.7220035871 × 68.9751485172 × 73.0888593942
76.4631368662 × 80.7121611984 × 84.1367252718
88.1949502903 × 92.4814994333 × 95.7870947748
100.0921946255

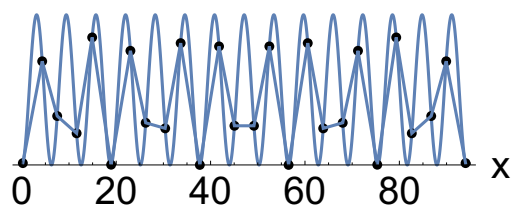
```



```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
N = 26 GOLD a0 - min
ENERGY 23.2885027051976
SetX = {0.21995890667405013, 4.321370519426381,
  7.498260832094262, 11.612546857750493, 14.91119922359362,
  18.924949480180906, 23.014021967291885, 26.249486158880668,
  30.383627981958238, 33.659289841141174, 37.7171766616071,
  41.793127414760285, 45.05425570113457, 49.193523253970184,
  52.45465123198195, 56.53060226632479, 60.58848877191492,
  63.86415077582497, 67.99829237124155, 71.23375611347994,
  75.3228289267958, 79.3365784261556, 82.63523155023022,
  86.74951781602937, 89.92640822842702, 94.02782023267424`}
Eigenvalues
{4.250373560337273`, 4.20814003585848`,
  4.139285264471082`, 4.045143060470541`, 3.9048433043575645`,
  3.7977701181343804`, 3.6426340706369356`, 3.4833498603057325`,
  3.3427902908678546`, 2.855440102297998`, 2.850961598537303`,
  2.3598862987836964`, 2.1980825707992944`, 2.0267014844887963`,
  1.825904783410279`, 1.8125817649767781`, 0.963962950279773`,
  0.8448942110364444`, 0.6977143387271967`, 0.551888347366036`,
  0.4144489272420171`, 0.35792204249164405`, 0.21628578754917957`,
  0.1340238345248648`, 0.07853535978575402`, 0.04808164628006789`}

```



```

gMin 372 energy = 22.99593373 detHess 74.2259
0.5170472492 × 4.8998763651 × 8.3002298129
12.6026559369 × 16.9413594215 × 20.3364444190
24.7280112195 × 28.7258074231 × 32.2873117193
36.6140374224 × 40.0564249651 × 44.2051278550
48.5748219675 × 51.9516911919 × 56.3219077938
60.4673027708 × 63.9115240324 × 68.2375479681
71.7944344369 × 75.7972362069 × 80.1885466014
83.5828923050 × 87.9230575175 × 92.2216978899
95.6222026891 × 100.0034881457

```

SP 165 energy = 24.0925805 detHess - 43.64419

3.4558434154 × 7.0335888687 × 11.2932683079

14.5969323350 × 18.7967529879 × 22.9437952409

26.2758853191 × 30.5179173550 × 33.9778615458

37.9855432730 × 42.2757558514 × 45.5751676396

49.8743358033 × 53.7922552514 × 57.3344486150

61.5840193085 × 64.8852906716 × 69.0723341800

73.2166864679 × 76.5418153955 × 80.7770718332

84.2263127153 × 88.2374602380 × 92.5181002053

95.8113355587 × 100.1045447007

iMin 373 energy = 23.28994593 detHess 272.6327

6.5143695392 × 10.6160324745 × 13.7888609208

17.9016415938 × 21.2022217307 × 25.2123993955

29.3021510098 × 32.5357294603 × 36.6693224732

39.9457249523 × 44.0023237170 × 48.0789477099

51.3392245166 × 55.4784923350 × 58.7404754346

62.8157489488 × 66.8749190361 × 70.1498472396

74.2845402023 × 77.5219026559 × 81.6102793709

85.6275864275 × 88.9243506965 × 93.0401667977

96.2212122867 × 100.3222889262

SP 582 energy = 24.092234993 detHess - 46.987

6.7014672229 × 10.9955414719 × 14.2896157213

18.5720921434 × 22.5806512528 × 26.0332626535

30.2695249801 × 33.5944991922 × 37.7403932631

41.9275570299 × 45.2295539289 × 49.4796668787

53.0223779516 × 56.9403674719 × 61.2401169320

64.5400856221 × 68.8306248109 × 72.8405693731

76.2991999823 × 80.5417640031 × 83.8758428352

88.0216812200 × 92.2245755225 × 95.5280726237

99.7896695561 × 103.3760225611

gMin 742 energy = 22.997112102 detHess 72.51

6.8134579410 × 11.1943239604 × 14.5948757664

18.8924948798 × 23.2330397579 × 26.6271880791

31.0184231946 × 35.0225407541 × 38.5782162373

42.9040596541 × 46.3487773516 × 50.4932914582

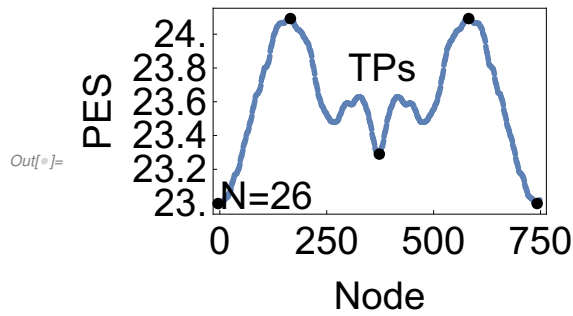
54.8636492406 × 58.2405232889 × 62.6100786172

66.7596729813 × 70.2015745503 × 74.5284957481

78.0912634698 × 82.0876932066 × 86.4793217020

89.8746051228 × 94.2129048739 × 98.5163369602

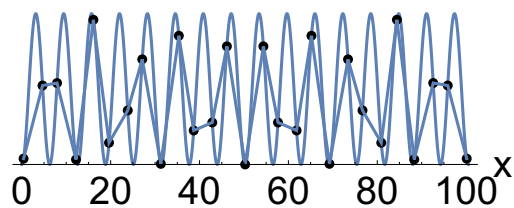
101.9166560623 × 106.2998920622



```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
N = 27 GOLD a0 - min
ENERGY 23.9743558356
SetX = {0.39585287681383463, 4.6646702053923175, 7.934625858684747,
 12.201331528413743, 16.11105139282814, 19.628510424929445,
 23.848505234308675, 27.109278258142822, 31.28886157630918,
 35.34172158026955, 38.688320847303224, 42.870511820081575,
 46.156211667454215, 50.26548245743669, 54.37475324741916,
 57.6604530947918, 61.842644067570156, 65.18924333460384,
 69.2421033385642, 73.42168665673057, 76.68245968056472,
 80.90245448994395, 84.41991352204525, 88.32963338645965,
 92.59633905618864, 95.86629470948108, 100.13511203805956`}
Eigenvalues
{4.254840217703765`, 4.216572077139343`, 4.1522780910129455`,
 4.065480545012655`, 3.978070756148179`, 3.8231637769263074`,
 3.6871154066971212`, 3.5377404459734323`, 3.3914386072933254`,
 3.050543784467723`, 3.0469075642735555`, 2.415119055946594`,
 2.276677645177095`, 2.106382221312989`, 1.9556475271387406`,
 1.6489562745637762`, 1.6448038852011106`, 0.9173283798416741`,
 0.7907710859547352`, 0.6480396198395274`, 0.504575995145738`,
 0.47007211928971726`, 0.31100892382387385`, 0.17914305693044513`,
 0.09666447263121022`, 0.03891412177148058`, 0.026655300814271195`}

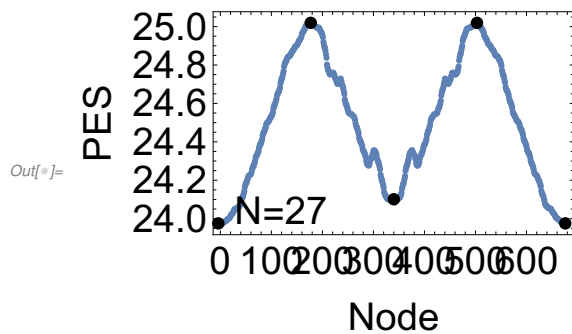
```



SP node177 energy = 25.0196147782 detHess - 79.277  
 0.5295499880 × 4.9075661969 × 8.3045690902  
 12.6017634074 × 16.9343431288 × 20.3256502086  
 24.7124764006 × 28.6913003422 × 32.2651355946  
 36.5897290093 × 40.0188983390 × 44.1804445042  
 48.5388439438 × 51.9093622199 × 56.2772110902  
 60.3769249068 × 63.8426775773 × 68.1557003266  
 71.6499113271 × 75.7142980236 × 80.0895224884  
 83.4649693428 × 87.8178671887 × 92.0245638340  
 95.4366432257 × 99.7766686377 × 103.4319180520

iMin 330 and 340 and 349

node340 energy = 24.1009262 detHess - 92.894  
 0.5721294597 × 4.9974667043 × 8.4631641517  
 12.7489776520 × 17.2163850320 × 20.6857370745  
 25.1200807568 × 29.5417643055 × 33.0091114673  
 37.4762080148 × 41.7222420246 × 45.1965584293  
 49.6079866504 × 53.4082782329 × 57.2073666938  
 61.6185436522 × 65.0929414455 × 69.3383993221  
 73.8053655189 × 77.2725750683 × 81.6940644814  
 86.1282090446 × 89.5974155203 × 94.0646990689  
 98.3499231298 × 101.8156398125 × 106.2407022464  
 SP node503 energy = 25.01961260 detHess - 84.8624  
 3.3515313124 × 7.0216029379 × 11.3647931014  
 14.7753737148 × 18.9891197025 × 23.3419768404  
 26.7189295596 × 31.0957638243 × 35.1578770809  
 38.6550525197 × 42.9690846808 × 46.4345807836  
 50.5360810013 × 54.9048894670 × 58.2763599349  
 62.6355474776 × 66.7996878007 × 70.2284380896  
 74.5543936054 × 78.1331550328 × 82.1074615873  
 86.4950476488 × 89.8877550813 × 94.2190218355  
 98.5215347811 × 101.9187149925 × 106.2991889640  
 gMin node676 energy = 23.975331 detHess 71.64  
 6.6739920046 × 10.9427320093 × 14.2128678423  
 18.4801397301 × 22.3863405483 × 25.9075559942  
 30.1283551680 × 33.3889951351 × 37.5698088547  
 41.6216795933 × 44.9695780377 × 49.1520074225  
 52.4371983185 × 56.5472052725 × 60.6557497349  
 63.9419667541 × 68.1239330034 × 71.4692672765  
 75.5230968479 × 79.7014753030 × 82.9623894216  
 87.1816000437 × 90.6954057448 × 94.6085371155  
 98.8746515674 × 102.1444203719 × 106.4132794136



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

```
N = 28 GOLD a0 - min
```

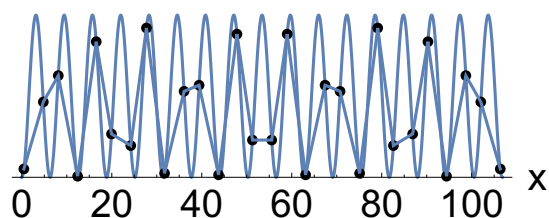
```
ENERGY 24.80823857397184
```

```
SetX = {0.45791021792594194,
```

```
  4.783206880860047,  8.111010074898452, 12.405962924373615,
 16.54119509335344, 19.9363185690331, 24.21656710311365,
 27.70353762332073, 31.73081039517778, 36.06778921010009,
 39.40659915848812, 43.736081457643635, 47.821828204847435,
 51.264935184689996, 55.54921739525925, 58.99232568420844,
 63.07807069419843, 67.40755311218227, 70.74636289154671,
 75.08334143099604, 79.11061543757455, 82.59758469170781,
 86.87783295668956, 90.27295675838663, 94.40818808204419,
 98.70314085726352, 102.03094380476291, 106.35624024815365`}
```

```
Eigenvalues
```

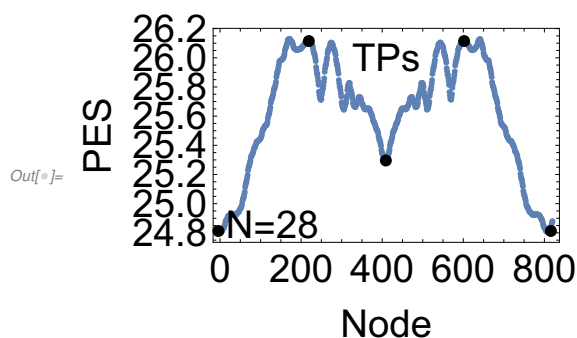
```
{4.26557164708687`, 4.229258182609465`, 4.166537568343962`, 4.103870571708044`,
 3.995564874688616`, 3.8793399574509593`, 3.7260735718079476`,
 3.6066006337254644`, 3.487868569976121`, 3.125797376450882`,
 3.123388046305966`, 2.501181861216486`, 2.359788530305602`,
 2.1930362381795643`, 2.0222329983821226`, 1.8681915778660885`,
 1.5688032528909943`, 1.565605725290422`, 0.8395902841239464`,
 0.741569445432151`, 0.5915911390001104`, 0.5606299396411786`,
 0.3499962487473257`, 0.2602872983366079`, 0.2116410932280412`,
 0.0998992047643768`, 0.050811352223538685`, 0.024191164439854047`}
```



```

SP node219 energy = 26.113775733 detHess - 188.9
0.5689681439 × 4.9891594870 × 8.4474079163
12.7346859011 × 17.1894855680 × 20.6482675150
25.0811890131 × 29.4625811270 × 32.9162571282
37.3674514466 × 41.4930323787 × 45.0115753573
49.3870455092 × 52.9927736236 × 57.0010523498
61.4464425642 × 64.9089675712 × 69.2460285508
73.7137054259 × 77.1878416742 × 81.6381318426
86.0451583682 × 89.5123465740 × 93.9792692773
98.1808965397 × 101.6710984990 × 106.0699897304
109.7915265026
iMin node409 energy = 25.295852933 detHess 7304.50271
0.5726378010 × 5.0115762419 × 8.4949383287
12.7798244726 × 17.2765472464 × 20.7732724675
25.2083650608 × 29.7190094250 × 33.2375964787
37.7248794482 × 42.2379271716 × 45.7660010190
50.2714955421 × 54.7830031135 × 58.3134375095
62.8251179754 × 67.3300633957 × 70.8578575199
75.3708921703 × 79.8565987076 × 83.3743936954
87.8847329667 × 92.3152957675 × 95.8105575444
100.3057871741 × 104.5777371847 × 108.0631511066
112.4972341309
SP node602 energy = 26.1146525929 detHess - 190.2585
3.2893932443 × 7.0187475372 × 11.4191059592
14.9078212084 × 19.1139915150 × 23.5815263436
27.0492528826 × 31.4578127121 × 35.9082464711
39.3827978507 × 43.8509839547 × 48.1882339134
51.6510129138 × 56.0966792242 × 60.1055902861
63.7110095721 × 68.0866300261 × 71.6057719863
75.7307840017 × 80.1822601478 × 83.6363018768
88.0174809566 × 92.4515220420 × 95.9108720293
100.3659657548 × 104.6568079778 × 108.1147927655
112.5365074192
gMin node816 energy = 24.8127416421 detHess 105.189
6.7456872082 × 11.0704035905 × 14.3979183789
18.6916296926 × 22.8280704242 × 26.2219261117
30.5020314393 × 33.9902484235 × 38.0157977047
42.3527659271 × 45.6914585478 × 50.0205939843
54.1072812939 × 57.5495932326 × 61.8338758282
65.2777820595 × 69.3625833204 × 73.6924090606
77.0313359325 × 81.3683217958 × 85.3973104392
88.8830444780 × 93.1634402679 × 96.5598413071
100.6938570885 × 104.9900456391 × 108.3181455442
112.6440150918

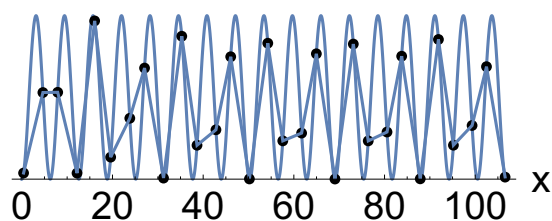
```



```

## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
N = 29 GOLD a0 - min
ENERGY 25.9633944819
SetX = {0.3894197342542542, 4.652293408609829,
  7.916972334245389, 12.17966799871559, 16.06522716186311,
  19.60107420686541, 23.819670250627038, 27.071294236064965,
  31.256054457759223, 35.28162273097537, 38.64472687366571,
  42.81868812198833, 46.074411243965066, 50.19729801146818,
  54.25205322240436, 57.558851937905935, 61.71258048614361,
  64.96652585701935, 69.065660840658, 73.11543830392178,
  76.40815190937924, 80.54765959048652, 83.78116193133704,
  87.87799843567599, 91.88834733708947, 95.19388255127235,
  99.3105604115137, 102.48800002640795, 106.59177202462972` }
Eigenvalues
{4.254752618898995`, 4.221211223277585`,
  4.165621080070327`, 4.089267493060478`, 3.9991029736102393`,
  3.875330109807919`, 3.756950863458334`, 3.6199670587899258`,
  3.4797443922316478`, 3.352365503023167`, 3.041490835663917`,
  2.8563206516828363`, 2.401126383332003`, 2.269954201269983`,
  2.1150032843268196`, 1.972192403077606`, 1.8154906025316677`,
  1.6542243387357896`, 0.9520488354322544`, 0.8430605761874096`,
  0.7146045921338343`, 0.5806497297109128`, 0.4774490913778436`,
  0.3997339241278385`, 0.2616450158011351`, 0.16597714696318877`,
  0.09932712607341583`, 0.05579408311319715`, 0.025572705661971517` }

```

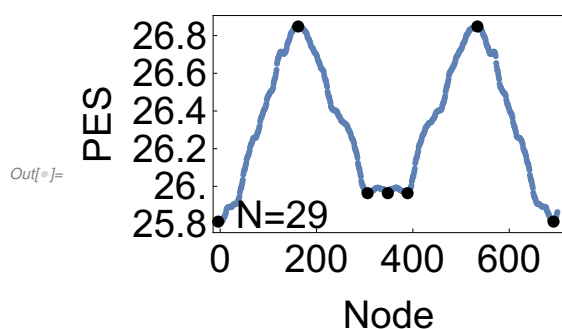


gMin at node306 energy = 25.81287870 detHess 144.1502



0.5375262030 × 4.9298249007 × 8.3456697969  
12.6430518041 × 17.0170398755 × 20.4250815039  
24.8331119493 × 28.9459763714 × 32.4365682258  
36.7796037655 × 40.3273357977 × 44.3661823152  
48.7795545091 × 52.1965258620 × 56.5493069710  
60.9027272864 × 64.3196635943 × 68.7331585564  
72.7739879806 × 76.3202326895 × 80.6632945078  
84.1552366309 × 88.2664113644 × 92.6748417232  
96.0832743749 × 100.4568784649 × 104.7564638607  
108.1722570366 × 112.5655169359

SP node162 energy = 26.8484630 detHess - 56.399  
 3.4451028248 × 7.0379334427 × 11.3158692818  
 14.6446625395 × 18.8474201585 × 23.0480420161  
 26.3778313083 × 30.6550455797 × 34.2427001245  
 38.1399991032 × 42.4640401291 × 45.7894610270  
 50.0870769325 × 54.2072322056 × 57.6099219479  
 61.8855796214 × 65.3499951040 × 69.3982506689  
 73.7259476398 × 77.0587892602 × 81.3876043268  
 85.4268234483 × 88.8982499590 × 93.1734765261  
 96.5694447030 × 100.6965092864 × 104.9883631544  
 108.3125513913 × 112.6341202430  
 iMin 306 energy = 25.96392165 detHess 156.95  
 SP node 348 energy = 25.97932078 detHess - 17.97  
 6.5244137639 × 10.6498274047 × 13.8344184486  
 17.9735301391 × 21.3444412080 × 25.3179141952  
 29.4755037281 × 32.7006309102 × 36.8851121624  
 40.3425542672 × 44.2777977651 × 48.5042600658  
 51.7487986868 × 55.9895133635 × 59.6997584702  
 63.4005056677 × 67.6397500436 × 70.8835518418  
 75.1078711987 × 79.0459005793 × 82.4991739054  
 86.6820664118 × 89.9062213355 × 94.0624028863  
 98.0342676234 × 101.4050175414 × 105.5427033539  
 108.7248606313 × 112.8498012232  
 iMin 389 energy = 25.96406069 detHess 197.28  
 SP node534 energy = 26.84886522 detHess - 74.26  
 6.7390516417 × 11.0617278177 × 14.3865913406  
 18.6805095305 × 22.8061853107 × 26.2041102970  
 30.4798922881 × 33.9504614762 × 37.9914840087  
 42.3207310728 × 45.6540948830 × 49.9823623859  
 54.0312770284 × 57.4957417999 × 61.7719166123  
 65.1757670074 × 69.2953543094 × 73.5942820021  
 76.9202651857 × 81.2450600881 × 85.1472216912  
 88.7308137311 × 93.0078219301 × 96.3390598767  
 100.5378764400 × 104.7436044736 × 108.0716298391  
 112.3509717474 × 115.9513399764  
 gMin node692 energy = 25.813078 detHess 142.72  
 6.8238366070 × 11.2156071761 × 14.6314874729  
 18.9276590466 × 23.3018543635 × 26.7096829799  
 31.1174927160 × 35.2312788361 × 38.7211364717  
 43.0641600041 × 46.6127118506 × 50.6504686573  
 55.0637718108 × 58.4807621329 × 62.8331912240  
 67.1869584668 × 70.6038754165 × 75.0174355837  
 79.0593435137 × 82.6047816881 × 86.9478602005  
 90.4405444921 × 94.5507933545 × 98.9594402198  
 102.3680873498 × 106.7414788125 × 111.0422628133  
 114.4580347431 × 118.8518173387



```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

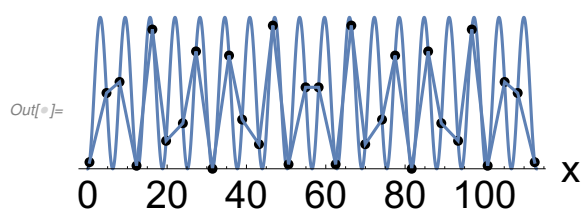
```
N = 30 GOLD a0 - min
```

```
ENERGY 26.69674754645
```

```
SetX = {0.4199150015143009, 4.710819919374936, 8.001726068211545,
 12.281737847010284, 16.280944612557104, 19.738011734390586,
 23.971177747705788, 27.286917413281742, 31.437262711704005,
 35.608942567149434, 38.91249184442661, 43.152844982612706,
 46.65563657918182, 50.60975640149817, 54.90138953855996,
 58.19594599067258, 62.48757912773438, 66.44169895005072,
 69.94449054661985, 74.18484368480594, 77.48839296208313,
 81.66007281752856, 85.81041811595082, 89.12615778152679,
 93.35932379484198, 96.81639091667547, 100.81559768222229,
 105.09560946102103, 108.38651560985763, 112.67742052771825`}
```

### Eigenvalues

```
Out[f*]= {4.26129, 4.22903, 4.1793, 4.10449, 4.03545, 3.92199, 3.78708, 3.66887,
 3.53055, 3.43048, 3.07783, 3.07618, 2.46405, 2.34116, 2.19036, 2.03597,
 1.90306, 1.61852, 1.61636, 0.882964, 0.795963, 0.68063, 0.530586,
 0.507495, 0.315287, 0.271994, 0.126048, 0.0780282, 0.0494072, 0.0148283}
```



SP node188 energy = 27.83369597 detHess - 112.26

0.5329324049 × 4.9243889686 × 8.3382334907

12.6371015049 × 17.0066414484 × 20.4129776333

24.8192866258 × 28.9172488744 × 32.4156801194

36.7554491843 × 40.2855053781 × 44.3426740926

48.7524697944 × 52.1639345076 × 56.5221986107

60.8539966504 × 64.2675059587 × 68.6718972823

72.6475093344 × 76.2421207688 × 80.5839708198

84.0357784685 × 88.1959822006 × 92.5855145879

95.9792273203 × 100.3600633490 × 104.5708285280

107.9993427565 × 112.3544284890 × 116.0330824043

iMin ? node360 energy = 26.9451251 detHess 611.93

0.5759096162 × 5.0060813843 × 8.4790716579

12.7629723750 × 17.2422107814 × 20.7221170212

25.1568367368 × 29.6156496289 × 33.1006778413

37.5792202083 × 41.9381579547 × 45.4070463310

49.8652887661 × 53.9339344645 × 57.4997590825

61.8796335220 × 65.4448033868 × 69.5143347274

73.9726362078 × 77.4414619810 × 81.8007474514

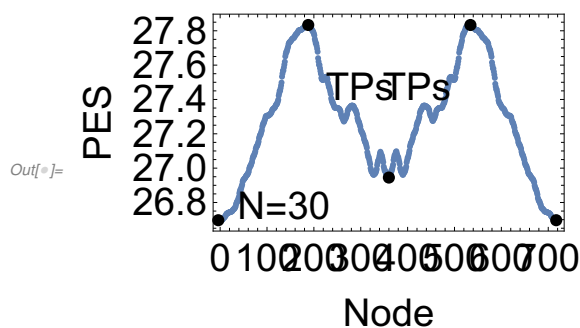
86.2790883183 × 89.7640011267 × 94.2228961650

98.6569103283 × 102.1365559535 × 106.6155963038

110.8973847869 × 114.3706478790 × 118.7999879712

SP node534

gMin node 717



### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

N = 31 GOLD a0 - min

ENERGY 27.6023665566773

SetX = {0.4628186178919749, 4.792512808023985, 8.125414957722265,

12.421704701536383, 16.57383242840991, 19.96430129645167,

24.252568825362385, 27.769987500703845, 31.770641421179388,

36.11861834817946, 39.46664245973314, 43.79537682357467,

47.938277665859545, 51.353872995738044, 55.65534953926679,

59.17767027492408, 63.190427239264665, 67.55412370972245,

70.91786898004742, 75.2548147531153, 79.44884261260555, 82.85396476294717,

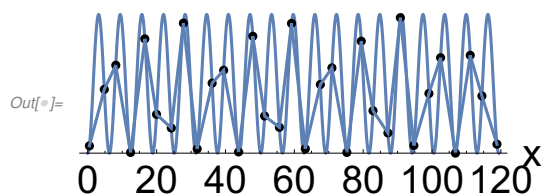
87.18083186504145, 90.80174974928886, 94.72242393747759,

99.1001202319081, 102.48759381124168, 106.80155281070678,

111.10291467060682, 114.49267170228524, 118.86707522786607` }

## Eigenvalues

Out[ ] = {4.26977, 4.24046, 4.19314, 4.13707, 4.04852, 3.95055, 3.84456, 3.70687,  
3.59683, 3.49451, 3.19456, 3.13088, 2.53075, 2.41346, 2.26383, 2.12161,  
1.96403, 1.83559, 1.56055, 1.49248, 0.832975, 0.748396, 0.642144, 0.582325,  
0.383864, 0.296918, 0.230479, 0.197153, 0.0714302, 0.0321231, 0.0112009}



start - 40 nodes !!

SP 327 energy = 28.748565455541957 detHess - 41.411

3.4477035608 × 7.0197154980 × 11.2634489480

14.5428467839 × 18.7410789338 × 22.8310467169

26.1764393705 × 30.3861024241 × 33.7385570523

37.8214490646 × 42.0263733687 × 45.3045471145

49.5519918939 × 53.1449597683 × 56.9970518639

61.2826538932 × 64.5684891319 × 68.8406044500

72.8417176757 × 76.2905592857 × 80.5179405768

83.8271392007 × 87.9755660832 × 92.1349645282

95.4376939523 × 99.6687605056 × 103.1405480994

107.1196017966 × 111.3993793714 × 114.6872308694

118.9748999868

node593 energy = 27.954961 detHess 846.969

6.5088713588 × 10.6108809820 × 13.7859770342

17.9000371179 × 21.2009616947 × 25.2123710664

29.3033261482 × 32.5375014766 × 36.6724623045

39.9518538326 × 44.0075931893 × 48.0886258872

51.3477599760 × 55.4899230424 × 58.7603449838

62.8323363070 × 66.9048108655 × 70.1748501032

74.3171527649 × 77.5769933701 × 81.6576413068

85.7145237946 × 88.9933773775 × 93.1289028199

96.3648177517 × 100.4552155346 × 104.4699363576

107.7691297673 × 111.8846251023 × 115.0635510404

119.1653121562

node860 energy = 28.749066 detHess - 52.0379614

6.6962583514 × 10.9833322980 × 14.2704811768

18.5487568663 × 22.5307490770 × 25.9989479900

30.2290243661 × 33.5318875669 × 37.6897926612

41.8383787085 × 45.1467526745 × 49.3736999103

52.8224546770 × 56.8230923376 × 61.0947230847

64.3801554105 × 68.6653347572 × 72.5158154617

76.1100038593 × 80.3573750098 × 83.6350378091

87.8403108919 × 91.9216202737 × 95.2749069249

99.4840101189 × 102.8272093121 × 106.9186107208

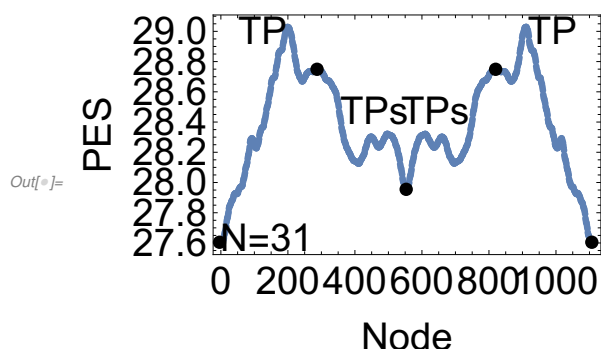
111.1142827532 × 114.3937357385 × 118.6357777283

122.2000367681

```

node1147 energy = 27.604828 detHess 54.69
6.7428036642 × 11.0728610627 × 14.4059035978
18.7030532333 × 22.8542236841 × 26.2455488419
30.5338175912 × 34.0500054599 × 38.0521991901
42.4001892585 × 45.7482433019 × 50.0773159728
54.2193305851 × 57.6355047208 × 61.9368384765
65.4579540216 × 69.4720322824 × 73.8355697927
77.1991404525 × 81.5363500427 × 85.7290088715
89.1346207962 × 93.4609936558 × 97.0792791006
101.0027119007 × 105.3805878513 × 108.7678656119
113.0827213128 × 117.3829633175 × 120.7728941779
125.1469498398

```



```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

```

```

N = 32 GOLD a0 - min

```

```

ENERGY 28.639781928413

```

```

SetX = {0.3926596066895102, 4.6585286460545765,
7.925847802617813, 12.19058569733379, 16.088320804593312,
19.61480343451723, 23.8340015932853, 27.089979477907285,
31.27221330478877, 35.31122808664873, 38.665895044216676,
42.84362499550095, 46.11327675242124, 50.230086252779344,
54.31150693928325, 57.60685354924486, 61.77366728716726,
65.06901389712885, 69.15043458363279, 73.26724408399087,
76.53689584091117, 80.71462579219546, 84.06929274976342,
88.10830753162338, 92.29054135850488, 95.54651924312687,
99.76571740189495, 103.29220003181891, 107.18993513907839,
111.45467303379436, 114.7219921903576, 118.98786122972265`}

```

```

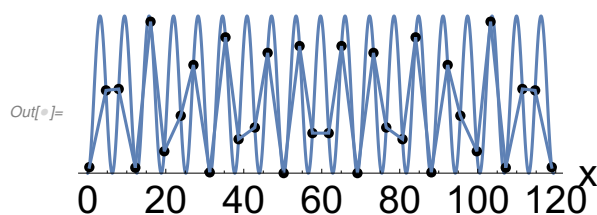
Eigenvalues

```

```

Out[ ] = {4.25793, 4.23106, 4.1854, 4.12216, 4.04494, 3.97184, 3.83574, 3.72498, 3.60176,
3.47637, 3.36046, 3.04572, 3.0445, 2.42552, 2.32533, 2.18905, 2.05021,
1.93961, 1.65124, 1.64986, 0.941419, 0.841904, 0.727512, 0.605235, 0.493463,
0.46846, 0.318622, 0.208482, 0.129997, 0.0746246, 0.0320947, 0.0257432}

```



SP node 184 energy = 29.6278077 detHess - 156.908

0.4592771658 × 4.7874591399 × 8.1184575554  
 12.4146856003 × 16.5598096325 × 19.9524359713  
 24.2375723517 × 27.7423940262 × 31.7544218113  
 36.0985177254 × 39.4430575608 × 43.7726444548  
 47.8941111361 × 51.3192836990 × 55.6137646039  
 59.1037039393 × 63.1471396429 × 67.5006642759  
 70.8551382699 × 75.1953146164 × 79.3339713948  
 82.7593565251 × 87.0657302187 × 90.5894836060  
 94.6072535386 × 98.9768053092 × 102.3464954670  
 106.6863873808 × 110.8988637558 × 114.3019453084  
 118.6387264274 × 122.2998956064

iMin node332

iSP node345 energy = 28.6437536 detHess - 9.51558

0.5459930919 × 4.9485846721 × 8.3789410145  
 12.6746416569 × 17.0784019290 × 20.5021667432  
 24.9225866181 × 29.1343953816 × 32.5883214592  
 36.9639298764 × 40.6688161607 × 44.5447456065  
 48.9539341229 × 52.3965396079 × 56.6862616291  
 61.1131437696 × 64.5509451046 × 68.9777707680  
 73.2677594895 × 76.7103167239 × 81.1195964829  
 84.9961552586 × 88.7004243801 × 93.0758962046  
 96.5298842520 × 100.7413807211 × 105.1617437432  
 108.5854350260 × 112.9890957242 × 117.2847278474  
 120.7150343560 × 125.1175557131

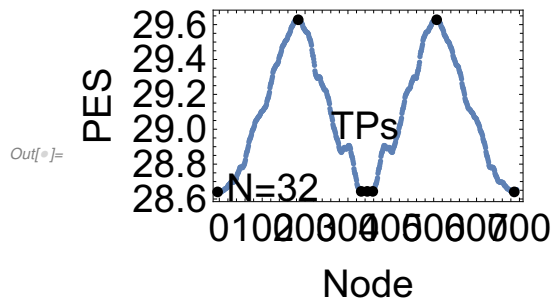
iMin node358

SP node507 energy = 29.6280573 detHess - 166.02

3.3671908180 × 7.0267338963 × 11.3631811566  
 14.7664383488 × 18.9781520812 × 23.3181078344  
 26.6876448420 × 31.0570555631 × 35.0752489282  
 38.5985336105 × 42.9047856365 × 46.3302554792  
 50.4686318998 × 54.8087633241 × 58.1631594820  
 62.5166011483 × 66.5599868252 × 70.0498889425  
 74.3443013907 × 77.7693456701 × 81.8908630098  
 86.2203062294 × 89.5647614307 × 93.9087853410  
 97.9202704873 × 101.4254475007 × 105.7105098386  
 109.1027194616 × 113.2482014552 × 117.5439777278  
 120.8748573577 × 125.2028153604

gMin node 687 energy = 28.64076877 detHess 152.83695

6.6810253258 × 10.9469931430 × 14.2141407919  
 18.4783274163 × 22.3797535130 × 25.9022818697  
 30.1206156128 × 33.3766560816 × 37.5576309976  
 41.5975965955 × 44.9508967906 × 49.1282902677  
 52.3982263552 × 56.5143814246 × 60.5962568712  
 63.8910920587 × 68.0579104380 × 71.3537810004  
 75.4347468970 × 79.5522278851 × 82.8215968860  
 86.9996778298 × 90.3557574232 × 94.3937899966  
 98.5773147117 × 101.8332371327 × 106.0533230669  
 109.5838882398 × 113.4777973495 × 117.7430557651



```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

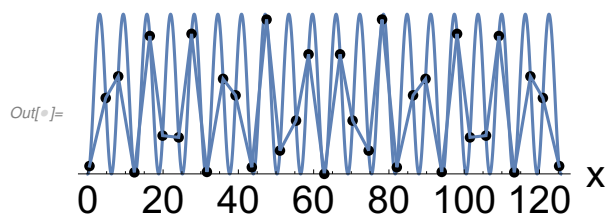
```
N = 33 GOLD a0 - min
```

```
ENERGY 29.44646594437
```

```
SetX = {0.4463825927251694, 4.761310081595781, 8.07743396890057,
12.368696089614962, 16.463568535241162, 19.872711638819126,
24.13561011370421, 27.55859112968978, 31.637750228956957,
35.93691832482305, 39.254347016027815, 43.57165463492125,
47.48976374395546, 51.05010732670924, 55.3170106777653,
58.64087266020749, 62.83185307179594, 67.02283348338449,
70.34669546582663, 74.61359881688273, 78.1739423996367,
82.09205150867069, 86.40935912756412, 89.72678781876887,
94.0259559146349, 98.10511501390216, 101.52809602988765,
105.79099450477271, 109.20013760835072, 113.29501005397684,
117.58627217469122, 120.90239606199599, 125.217323550866}
```

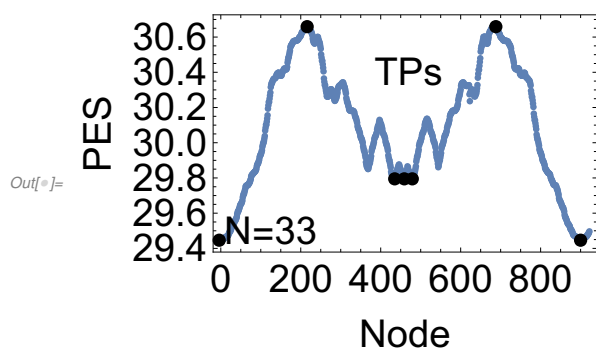
```
Eigenvalues
```

```
Out[*]= {4.26547, 4.24098, 4.19665, 4.13678, 4.08072, 3.98154, 3.88555, 3.75823, 3.64663,
3.54517, 3.44358, 3.11025, 3.10946, 2.49395, 2.3951, 2.26383, 2.11369, 1.98003,
1.87135, 1.58331, 1.58229, 0.869401, 0.790775, 0.696721, 0.564266, 0.545868,
0.342213, 0.27233, 0.238935, 0.103178, 0.0807837, 0.0353122, 0.00941053}
```





SP node216 energy = 30.659138 detHess - 185.28  
 0.5464205327  $\times$  4.9395728096  $\times$  8.3584205289  
 12.6527140520  $\times$  17.0332437682  $\times$  20.4437614052  
 24.8540050603  $\times$  28.9891078996  $\times$  32.4687639767  
 36.8172516143  $\times$  40.3938164601  $\times$  44.4025425822  
 48.8192532468  $\times$  52.2437123668  $\times$  56.5863122872  
 60.9665478398  $\times$  64.3898385843  $\times$  68.8130472715  
 72.9388341613  $\times$  76.4341164599  $\times$  80.7897165568  
 84.3671807792  $\times$  88.3848445210  $\times$  92.8104971769  
 96.2450495781  $\times$  100.5900321098  $\times$  104.9940474956  
 108.4289790882  $\times$  112.8629414064  $\times$  117.0646500058  
 120.5313212134  $\times$  124.9110830129  $\times$  128.6072890839  
 iMin ? node435 energy = 29.7949063883 detHess 1239.4542  
 node 459 energy = 29.795969 detHess - 924.4302  
 0.5921895309  $\times$  5.0225533787  $\times$  8.5006338206  
 12.7768196472  $\times$  17.2619045206  $\times$  20.7471314374  
 25.1794394704  $\times$  29.6584287741  $\times$  33.1547962228  
 37.6370725626  $\times$  42.0573494110  $\times$  45.5396851474  
 50.0219309934  $\times$  54.2630260476  $\times$  57.7489265046  
 62.1669597729  $\times$  65.9680178769  $\times$  69.7745038027  
 74.1936841818  $\times$  77.6791901593  $\times$  81.9229470947  
 86.4059003910  $\times$  89.8889269206  $\times$  94.3101077048  
 98.7935762386  $\times$  102.2908892147  $\times$  106.7703707426  
 111.2060867745  $\times$  114.6927098042  $\times$  119.1790308114  
 123.4652223851  $\times$  126.9420261749  $\times$  131.3763628006  
 node 479



```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

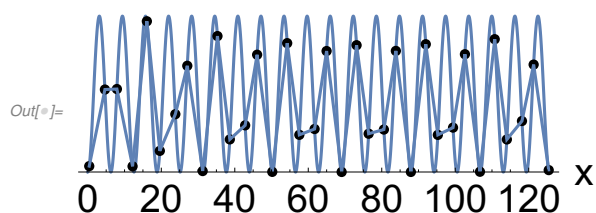
N = 34 GOLD a0 - min

ENERGY 30.630146602938

```
SetX = {0.390159888378491, 4.653718376454615, 7.918997516761689,
12.182163376685358, 16.070504984718426, 19.604194713447384,
23.82291002437076, 27.07548385325618, 31.259679224321562,
35.28826231097606, 38.6494221322531, 42.82417807210213,
46.082883573775234, 50.20450222865281, 54.26517836947516,
57.56925087918322, 61.725736263197874, 64.9882564363055,
69.08415324104325, 73.14916961704702, 76.43551893329528,
80.58290021361287, 83.83975134679989, 87.92890560193366, 91.9823787115983,
95.26754492815833, 99.40469638719784, 102.63903420156592,
106.73247925848734, 110.74434425584465, 114.04684095431202,
118.16246541022862, 121.3396603959325, 125.44239321201884`}
```

Eigenvalues

```
Out[*]= {4.2577, 4.23344, 4.19303, 4.1371, 4.06697, 3.98934, 3.87833, 3.78101, 3.6669,
3.54813, 3.43202, 3.33277, 3.0423, 2.85495, 2.41478, 2.31608, 2.19008, 2.0613,
1.95212, 1.81678, 1.65339, 0.966848, 0.881984, 0.77732, 0.664904, 0.551983,
0.47448, 0.396209, 0.281486, 0.194911, 0.129964, 0.0822412, 0.0508939, 0.0261671}
```



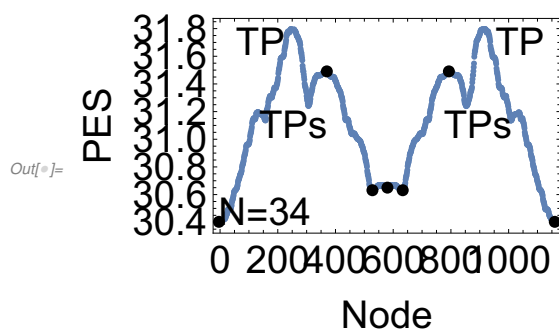
gMin node554 energy = 30.403059029 detHess 131.87

```
0.5230052328 × 4.9010827033 × 8.2969100745
12.5962378928 × 16.9254285493 × 20.3163939106
24.7019604687 × 28.6699466674 × 32.2525591510
36.5775629328 × 40.0017925195 × 44.1699385707
48.5246268586 × 51.8937404091 × 56.2612034946
60.3451451195 × 63.8200189425 × 68.1299109703
71.6064604750 × 75.6883321547 × 80.0562599971
83.4256645822 × 87.7800627924 × 91.9509749868
95.3740567752 × 99.6999561063 × 103.2872436214
107.2503812204 × 111.6360452567 × 115.0276990918
119.3554021146 × 123.6579890570 × 127.0536725673
131.4330508544
```

SP node370 energy = 31.49076808 detHess - 48.24

```
3.4320127937 × 7.0242808057 × 11.2916453158
14.6025196228 × 18.8070572894 × 22.9691091157
26.3018013228 × 30.5548770150 × 34.0494258152
38.0304869788 × 42.3368918007 × 45.6460785849
49.9509453679 × 53.9464358464 × 57.4283387411
61.6807708353 × 65.0199974438 × 69.1746405242
73.3888504675 × 76.6977035061 × 80.9699754521
84.5893271542 × 88.4402325628 × 92.7490439275
```

96.0604505372 × 100.3427478173 × 104.4379373194  
 107.8403159273 × 112.0980132601 × 115.5146059808  
 119.5938266605 × 123.8847392932 × 127.1972412757  
 131.5090491402  
 iMin 528 energy = 30.63119290 detHess 509.9299  
 580 energy = 30.65017060 detHess - 5.157  
 6.5182022186 × 10.6334032527 × 13.8134744679  
 17.9416131040 × 21.2815122572 × 25.2729693356  
 29.4041954003 × 32.6310683689 × 36.7953601298  
 40.1739983970 × 44.1710374567 × 48.3556982374  
 51.5972673109 × 55.8104088601 × 59.3505492632  
 63.2239044346 × 67.4793445440 × 70.7368897576  
 74.9931319451 × 78.8552710546 × 82.4071613836  
 86.6227501313 × 89.8644341339 × 94.0524699924  
 98.0464355777 × 101.4296069087 × 105.5952602772  
 108.8221963337 × 112.9550520554 × 116.9461038959  
 120.2874663938 × 124.4164543002 × 127.5973277250  
 131.7130989751  
 633 energy = 30.631470485 detHess 582.957  
 SP 793 energy = 31.49184507 detHess - 46.232  
 6.7228084964 × 11.0344157074 × 14.3467771514  
 18.6372506914 × 22.7170103011 × 26.1329897131  
 30.3905743405 × 33.7932620072 × 37.8879506259  
 42.1703576922 × 45.4816991436 × 49.7904931020  
 53.6419580792 × 57.2606938877 × 61.5327986626  
 64.8415986274 × 69.0555973207 × 73.2101899528  
 76.5493020721 × 80.8016181080 × 84.2833285194  
 88.2788945337 × 92.5836116076 × 95.8926846501  
 100.1990128983 × 104.1794520463 × 107.6744266245  
 111.9274240720 × 115.2597054706 × 119.4220510219  
 123.6259148216 × 126.9368534351 × 131.2038206546  
 134.7942354589  
 gMin 1160  
 6.7983647463 × 11.1775553469 × 14.5732588533  
 18.8753717183 × 23.2032975127 × 26.5948508497  
 30.9805035987 × 34.9443624350 × 38.5309544562  
 42.8567201302 × 46.2799695628 × 50.4504730020  
 54.8049136805 × 58.1742743028 × 62.5421332215  
 66.6243083780 × 70.1006106103 × 74.4105011621  
 77.8856175305 × 81.9692575641 × 86.3367875686  
 89.7059422262 × 94.0605881800 × 98.2291340099  
 101.6531957648 × 105.9783276636 × 109.5616112185  
 113.5289013400 × 117.9144850207 × 121.3055510670  
 125.6345296146 × 129.9343357726 × 133.3301410444  
 137.7084109170



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

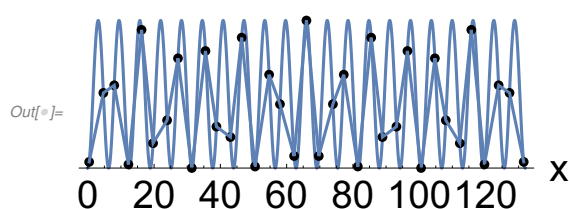
```
N = 35 GOLD a0 - min
```

```
ENERGY 31.35463584241
```

```
SetX = {0.41084584116802814, 4.693452842467162,
  7.976239127068572, 12.251561268460284, 16.217248217483014,
  19.69538210073832, 23.922035201813856, 27.212823293351757,
  31.376704356417093, 35.50137329566, 38.816217032238534,
  43.02989622310061, 46.428765676234946, 50.46811590063862,
  54.708715713633254, 57.985319778877205, 62.252939979784365,
  65.97344572536612, 69.69395147096742, 73.96157167187776,
  77.23817573712273, 81.47877555012245, 85.51812577452118,
  88.91699522766224, 93.13067441852611, 96.44551815510353,
  100.57018709434989, 104.73406815741436, 108.02485624895392,
  112.25150935002986, 115.72964323328351, 119.69533018230877,
  123.97065232370085, 127.25343860830286, 131.5360456096026`}
```

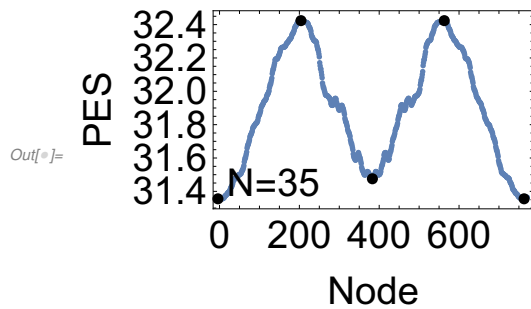
```
Eigenvalues
```

```
Out[ ] = {4.26259, 4.23942, 4.20141, 4.1504, 4.08034, 4.02134, 3.92095,
  3.80565, 3.70478, 3.59408, 3.47879, 3.40286, 3.06639, 3.06585,
  2.46644, 2.37344, 2.25122, 2.1243, 1.99693, 1.89674, 1.62918, 1.62846,
  0.903891, 0.840882, 0.735154, 0.64569, 0.512789, 0.498951, 0.318147,
  0.287284, 0.147103, 0.110651, 0.0523848, 0.0425905, 0.000109366}
```



```
SP node204 energy = 32.4238116 detHess - 181.85
0.5238928082 × 4.9004916510 × 8.2947296987
12.5934005264 × 16.9190979750 × 20.3087794505
24.6922431357 × 28.6493167580 × 32.2401337851
36.5649604372 × 39.9836114601 × 44.1582052381
48.5078013002 × 51.8748095652 × 56.2410756124
60.3045769794 × 63.7916781731 × 68.0978706146
71.5534407456 × 75.6556653474 × 80.0124973097
83.3741387235 × 87.7283554656 × 91.8485246164
95.2926814053 × 99.6017134406 × 103.1095732531
107.1511453709 × 111.5233702422 × 114.8956001332
```

119.2420704743 × 123.4505323437 × 126.8583205298  
 131.1961827757 × 134.8518879030  
 iMin node383 energy = 31.47545892 detHess 347.26  
 0.5657382533 × 4.9812726061 × 8.4327388909  
 12.7213482325 × 17.1643155599 × 20.6138244614  
 25.0446759213 × 29.3875758614 × 32.8333402421  
 37.2673645524 × 41.2829304699 × 44.8705440264  
 49.2341246995 × 52.7397081744 × 56.8642116340  
 61.2990486280 × 64.7346072268 × 69.1155719358  
 73.4970702016 × 76.9326419187 × 81.3675520259  
 85.4937326553 × 88.9983544834 × 93.3622050485  
 96.9517768918 × 100.9651113774 × 105.3990820635  
 108.8451538954 × 113.1871861544 × 117.6189481914  
 121.0688529037 × 125.5118582392 × 129.8035985438  
 133.2547877303 × 137.6716172865  
 SP node563 energy = 32.42373753 detHess - 217.9  
 3.3820551383 × 7.0359051951 × 11.3733815998  
 14.7813822893 × 18.9889542312 × 23.3354734590  
 26.7075279233 × 31.0795744260 × 35.1215751132  
 38.6289575790 × 42.9378677518 × 46.3821399134  
 50.5019911927 × 54.8561524586 × 58.2177123382  
 62.5744497398 × 66.6766168473 × 70.1321441030  
 74.4382610482 × 77.9252078536 × 81.9887933589  
 86.3549455035 × 89.7218523105 × 94.0714254465  
 98.2455571266 × 101.6643408898 × 105.9889720787  
 109.5789346165 × 113.5368516826 × 117.9202704028  
 121.3097931005 × 125.6357484226 × 129.9337496659  
 133.3280007567 × 137.7043151435  
 gMin node763 energy = 31.355328627 detHess - 1.1417548008897531  
 ? BBP point crossed?  
 6.6943206193 10.9770897763 × 14.2600297671  
 18.5354316106 × 22.5018497035 × 25.9794787636  
 30.2062310625 × 33.4974749071 × 37.6610958816  
 41.7867100507 × 45.1012386998 × 49.3154061387  
 52.7161136819 × 56.7540996114 × 60.9960754861  
 64.2729539516 × 68.5414337454 × 72.2672502582  
 75.9824477450 × 80.2491975364 × 83.5255348515  
 87.7647496318 × 91.8054473188 × 95.2024931990  
 99.4156873540 × 102.7308485797 × 106.8545746672  
 111.0187141908 × 114.3090494920 × 118.5356044824  
 122.0142438817 × 125.9792001338 × 130.2544425035  
 133.5370754318 × 137.8195204254



```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

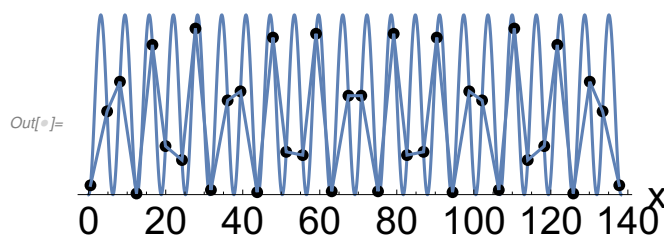
```
N = 36 GOLD a0 - min
```

```
ENERGY 32.21312829693
```

```
SetX = {0.4589927426155648, 4.785260050538228, 8.114181145413166,
 12.409440974516166, 16.548414572827163, 19.94244359941442,
 24.22443173680536, 27.71795439373406, 31.739592355446064,
 36.079274631560395, 39.42015901930255, 43.74977699955152,
 47.848964850439025, 51.28496102227686, 55.572792449421144,
 59.03243128069329, 63.103470638628345, 67.44280017244047,
 70.78727067681, 75.12660099093897, 79.19763633586193,
 82.65727845244545, 86.94510993490603, 90.38110368651635,
 94.48029517227761, 98.8099130230761, 102.15079820666885,
 106.49048132799903, 110.51211742349642, 114.00564249745905,
 118.28763091457401, 121.68165968665019, 125.82063445272927,
 130.11589423500965, 133.44481570098, 137.7710834546421`}
```

```
Eigenvalues
```

```
Out[ ]= {4.27082, 4.24888, 4.21299, 4.1593, 4.11441, 4.03224, 3.94682,
 3.85488, 3.73047, 3.64222, 3.54482, 3.46755, 3.12616, 3.1258, 2.52905,
 2.43766, 2.31755, 2.18892, 2.05817, 1.93274, 1.83315, 1.566, 1.56544,
 0.853624, 0.790927, 0.708978, 0.58416, 0.569783, 0.377944, 0.304166,
 0.241469, 0.20763, 0.106232, 0.0661038, 0.0368845, 0.0210027}
```



```

min 32.2131282969346
SP node253 energy = 33.490614789 detHess - 353.6
0.5682507935 × 4.9827724887 × 8.4336256520
12.7211364989 × 17.1627961322 × 20.6111719963
25.0413969489 × 29.3804045948 × 32.8254676679
37.2575572714 × 41.2623014237 × 44.8578275071
49.2212369418 × 52.7201007620 × 56.8531653330
61.2860437986 × 64.7192344243 × 69.1027291677
73.4739150107 × 76.9069383094 × 81.3380351579
85.4324661193 × 88.9544686469 × 93.3124282015
96.8655800563 × 100.9188994165 × 105.3504959840
108.7878267764 × 113.1450931306 × 117.5500989340
120.9886185697 × 125.4264425887 × 129.6292228810
133.0981858865 × 137.4804408281 × 141.1813234409
iMin ? 552 energy = 32.648541162867 detHess 2802.9
0.5766572230 × 5.0076595573 × 8.4819384516
12.7654468970 × 17.2467192842 × 20.7285049182
25.1631860408 × 29.6283072725 × 33.1168426519
37.5969243892 × 41.9749964247 × 45.4468334128
49.9130301110 × 54.0340263676 × 57.5683440666
61.9546003328 × 65.5718710436 × 69.5800099976
74.0365463868 × 77.5148685908 × 81.8478778621
86.3465882060 × 89.8464127236 × 94.2982585147
98.8005617777 × 102.3155751914 × 106.8078173529
111.2937266875 × 114.8066146674 × 119.3099292171
123.7427107611 × 127.2361878666 × 131.7296635519
136.0076157355 × 139.4904926740 × 143.9255870662
and nodes 567 × 632 × 701 × 756

```

```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

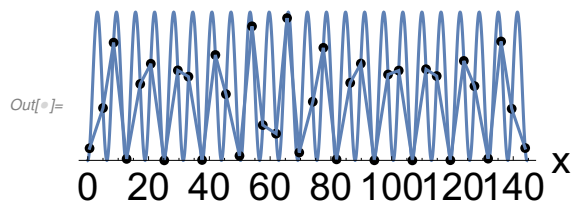
```
N = 36 GOLD a0 - min
```

```
ENERGY 32.6441369902
```

```
SetX = {0.5791677211452615, 5.0097173754875755, 8.484144437754198,
12.76650308263159, 17.24766088428698, 20.729302211867164,
25.163596906956588, 29.62874238437491, 33.117208497184194,
37.597173431974426, 41.97537641176294, 45.44718376121635,
49.913387917177744, 54.03472746532014, 57.568820839605614,
61.95510234009428, 65.5727193016837, 69.58042358331357,
74.03689493705613, 77.51522452600253, 81.84805634419239,
86.34676524689048, 89.84657998441317, 94.29836479467937,
98.80071322127961, 102.31574774094194, 106.80797438078058,
111.29402521860555, 114.80698586946973, 119.31032178082722,
123.74351627813631, 127.2371302810956, 131.73074083136234,
136.00987996680303, 139.49257261596642, 143.9281159160799`}
```

```
Eigenvalues
```

```
Out[*]= {4.29745, 4.27939, 4.24002, 4.1902, 4.13262, 4.05743, 3.97884,
3.88928, 3.80111, 3.72645, 3.59462, 3.28988, 3.28164, 2.68917,
2.60441, 2.47719, 2.33291, 2.1878, 2.04105, 1.89147, 1.76043, 1.65751,
1.39089, 1.3787, 0.78327, 0.754807, 0.620003, 0.521293, 0.441877,
0.337616, 0.279711, 0.20599, 0.161191, 0.126484, 0.114732, 0.00770904}
```



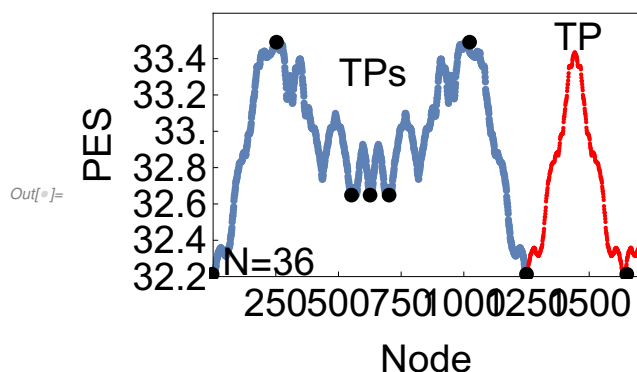
```
iMin is asymm and stretched
```



```

start iMin
0.5820972103 × 5.0130995446 × 8.4873784389
12.7708868843 × 17.2521592715 × 20.7339449055
25.1686260281 × 29.6337472598 × 33.1222826392
37.6023643765 × 41.9804364120 × 45.4522734001
49.9184700983 × 54.0394663549 × 57.5737840539
61.9600403201 × 65.5773110309 × 69.5854499849
74.0419863741 × 77.5203085781 × 81.8533178494
86.3520281933 × 89.8518527109 × 94.3036985020
98.8060017650 × 102.3210151787 × 106.8132573402
111.2991666748 × 114.8120546547 × 119.3153692044
123.7481507484 × 127.2416278539 × 131.7351035392
136.0130557228 × 139.4959326613 × 143.9310270535
next iMin node81 energy = 32.6443435 detHess 3718.41
but same point like start
  node142 but same point like start
158 × 2 × but same point like start
SP node 459 energy = 33.491291751 detHess - 307.7
3.2965250224 × 7.0143362270 × 11.3998742607
14.8660342988 × 19.0781235859 × 23.5167955460
26.9564865651 × 31.3643561973 × 35.7206783463
39.1589403874 × 43.5910518195 × 47.6418233138
51.1975090697 × 55.5560246970 × 59.0770670433
63.1735913676 × 67.6052410660 × 71.0387506274
75.4106290464 × 79.7949125074 × 83.2286167434
87.6620427818 × 91.7975120193 × 95.2954226824
99.6595814251 × 103.2585198516 × 107.2597674209
111.6920298788 × 115.1379546949 × 119.4755280190
123.9079656619 × 127.3574567832 × 131.7993985410
136.0943815716 × 139.5447218539 × 143.9624343981
gMin node705 energy = 32.22632344 detHess 287.80
6.7483062314 × 11.0737671280 × 14.4022835274
18.6958618861 × 22.8363505849 × 26.2287341066
30.5105002230 × 34.0055779287 × 38.0249968498
42.3645631089 × 45.7052307402 × 50.0343478029
54.1343827140 × 57.5695567101 × 61.8573036352
65.3176015978 × 69.3877280203 × 73.7271771097
77.0716470482 × 81.4108554530 × 85.4827989759
88.9417857679 × 93.2297022412 × 96.6665185076
100.7648622265 × 105.0949764094 × 108.4360783504
112.7758733456 × 116.7997141605 × 120.2917030180
124.5739206223 × 127.9696105258 × 132.1070587178
136.4039902447 × 139.7333317149 × 144.0603931337
top is TP
gMin node1095 energy = 32.22615659880 detHess 385.185
same point like 705

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

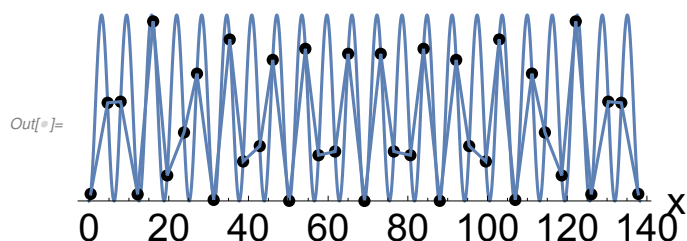
```
N = 37 GOLD a0 - min
```

```
ENERGY 33.30589769286978
```

```
SetX = {0.3913499890825055, 4.656008768918429, 7.922256661468944,
12.186174801945748, 16.078990760769617, 19.609233551374647,
23.828164166105434, 27.082322263555525, 31.265595117973703,
35.299101909319184, 38.657152817436305, 42.833270178982076,
46.09702117984329, 50.216454739425785, 54.28688033374137,
57.58669109778477, 61.74790378247866, 65.02530430543207, 69.1150379908497,
73.20477135071854, 76.48217250691499, 80.64338589909302,
83.94319752238997, 88.01362298867198, 92.13305744594744,
95.39680794365319, 99.57292520807243, 102.9309766525019,
106.96448250298418, 111.14775498931425, 114.40191265223018,
118.62084327506552, 122.15108628375135, 126.04390201603029,
130.3078200722661, 133.5740678734546, 137.8387266479262`}
```

```
Eigenvalues
```

```
Out[*]= {4.2598, 4.23998, 4.20593, 4.1585, 4.09856, 4.02993, 3.96737,
3.84442, 3.75164, 3.64723, 3.53923, 3.4336, 3.34033, 3.04384, 3.04343,
2.43115, 2.35657, 2.24655, 2.12691, 2.01378, 1.93087, 1.65227, 1.65181,
0.957557, 0.877213, 0.782618, 0.680511, 0.574487, 0.486977, 0.467196,
0.323374, 0.231945, 0.158357, 0.103044, 0.0626126, 0.0291015, 0.025704}
```



```
It is iMin not gMin! compressed state
```

```
SP node214 it is begin
```

```
gMin node395 energy = 33.2116942 detHess - 18.3740368 flach!
```

```
0.5288802588 × 4.9162112464 × 8.3242421806
```

```
12.6237233748 × 16.9805258924 × 20.3814714347
```

```
24.7816612134 × 28.8379388480 × 32.3599794172
```

```
36.6919617888 × 40.1786315270 × 44.2800544285
```

```
48.6748542415 × 52.0698506999 × 56.4376930273
```

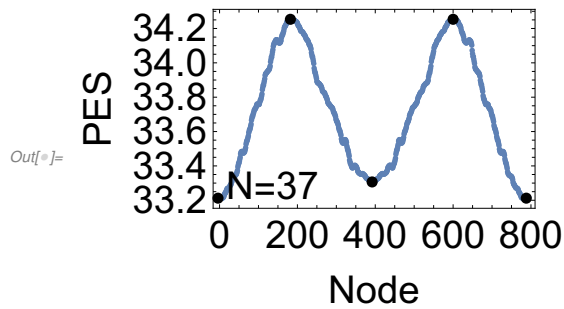
```
60.6947882600 × 64.1079747385 × 68.4780578980
```

72.2533702783 × 76.0319434071 × 80.4026628480  
 83.8157266807 × 88.0741698772 × 92.4419695066  
 95.8372580019 × 100.2323719925 × 104.3333103012  
 107.8205372787 × 112.1526689952 × 115.6744991484  
 119.7312627993 × 124.1316211430 × 127.5327286764  
 131.8896953878 × 136.1894972161 × 139.5976325983  
 143.9851856284  
 SP node577 energy = 34.253417 detHess - 138.250  
 3.4386840210 × 7.0358058398 × 11.3164814905  
 14.6482074894 × 18.8521695515 × 23.0587452408  
 26.3892768570 × 30.6708336401 × 34.2743503291  
 38.1572667245 × 42.4824771491 × 45.8102053358  
 50.1050619540 × 54.2401852474 × 57.6352817863  
 61.9154341948 × 65.4021595967 × 69.4295993937  
 73.7664382465 × 77.1051363588 × 81.4345849355  
 85.5197080054 × 88.9631359937 × 93.2472461459  
 96.6895972024 × 100.7759938853 × 105.1049749983  
 108.4435152026 × 112.7803407534 × 116.8054538251  
 120.2938631643 × 124.5738231691 × 127.9672103881  
 132.1039634514 × 136.3971434417 × 139.7244850385  
 144.0489104869  
 iMin node 787 energy = 33.306644157 detHess 368.5524  
 6.6727195913 × 10.9373250292 × 14.2036264755  
 18.4677202998 × 22.3591896034 × 25.8908705707  
 30.1101158582 × 33.3642648863 × 37.5479874574  
 41.5811602308 × 44.9397086173 × 49.1159612538  
 52.3796456369 × 56.4993028232 × 60.5696151152  
 63.8695998443 × 68.0308459829 × 71.3081660760  
 75.3980078071 × 79.4876336590 × 82.7651155713  
 86.9262962432 × 90.2259354944 × 94.2964738180  
 98.4156871107 × 101.6795044161 × 105.8554880932  
 109.2130482306 × 113.2468837399 × 117.4297106501  
 120.6838780656 × 124.9024962897 × 128.4313166273  
 132.3254622058 × 136.5892005860 × 139.8553935537  
 144.1201006488  
 SP node998 energy = 34.25374585 detHess - 185.9978  
 6.7447995723 × 11.0696141460 × 14.3971684182  
 18.6911122888 × 22.8272746333 × 26.2213851511  
 30.5014946023 × 33.9893879960 × 38.0153391470  
 42.3522734517 × 45.6909611846 × 50.0201602091  
 54.1064902963 × 57.5490500973 × 61.8332873969  
 65.2768295462 × 69.3619976106 × 73.6916222566  
 77.0304542516 × 81.3673997572 × 85.3954709581  
 88.8818328421 × 93.1621203677 × 96.5577968634  
 100.6924670119 × 104.9879380980 × 108.3158508549  
 112.6413774540 × 116.5265813394 × 120.1280826335  
 124.4094366572 × 127.7404684505 × 131.9462069615  
 136.1512609834 × 139.4826053495 × 143.7637286217  
 147.3635545822

```

gMin node1179 energy = 33.212248 detHess - 11.4664834
6.8113188323 × 11.1988560933 × 14.6069840473
18.9067631046 × 23.2637181469 × 26.6648141726
31.0651605418 × 35.1218896501 × 38.6437347503
42.9758558473 × 46.4630431891 × 50.5640159821
54.9591076872 × 58.3543754263 × 62.7221781479
66.9805256859 × 70.3935980417 × 74.7642722976
78.5426135724 × 82.3181576182 × 86.6882860393
90.1014636036 × 94.3586547938 × 98.7264941393
102.1215113526 × 106.5163335388 × 110.6177220232
114.1044313462 × 118.4364243240 × 121.9584499102
126.0147621093 × 130.4149638699 × 133.8159209251
138.1727351186 × 142.4722390914 × 145.8802774442
150.2676242130

```



```
### ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

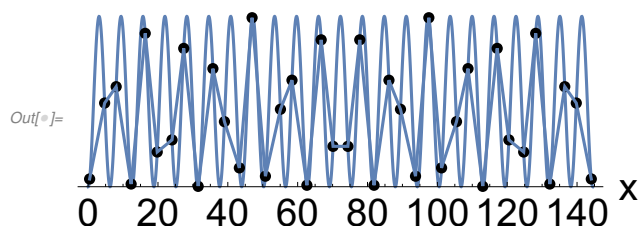
N = 38 GOLD a0 - min

ENERGY 34.09321944935

```
SetX = {0.4297603766286884, 4.729635435105601, 8.029659209996492,
12.314291326253544, 16.349505371451688, 19.786287771190022,
24.028696446142874, 27.37807035853357, 31.50844308698144,
35.731200443309625, 39.031777196595144, 43.304134500466894,
46.94912851427126, 50.7679955962209, 55.06849218723271, 58.37309202917059,
62.64570035224957, 66.73322921443317, 70.13199358258736,
74.381268482543, 77.78003285069713, 81.86756171288079, 86.1401700359597,
89.44476987789757, 93.74526646890936, 97.56413355085876,
101.20912756466336, 105.48148486853515, 108.78206162182066,
113.00481897814893, 117.13519170659676, 120.48456561898752,
124.72697429394039, 128.1637566936787, 132.19897073887688,
136.48360285513394, 139.78362663002486, 144.08350168850177`}
```

Eigenvalues

```
Out[*]= {4.26656, 4.2464, 4.21509, 4.17105, 4.11029, 4.06157, 3.97503, 3.88797,
3.77927, 3.68948, 3.58274, 3.49494, 3.42543, 3.08918, 3.08893, 2.49657,
2.41251, 2.31061, 2.18653, 2.06195, 1.95715, 1.86502, 1.60495, 1.60459,
0.884444, 0.826255, 0.752422, 0.663587, 0.537266, 0.527212, 0.341307,
0.285713, 0.258542, 0.121308, 0.083044, 0.0704175, 0.0136005, 0.00128502}
```



SP node217 energy = 35.233426 detHess - 143.07

```
0.5293060674 × 4.9123651290 × 8.3153528745
12.6137835156 × 16.9596092962 × 20.3559327137
24.7501819104 × 28.7711351067 × 32.3154724021
36.6428542322 × 40.0997162341 × 44.2315956191
48.6101991802 × 51.9923696413 × 56.3623826387
60.5471860580 × 63.9761563205 × 68.3155486735
71.9379405546 × 75.8736556823 × 80.2670933854
83.6727492344 × 87.9912721019 × 92.3364696064
95.7390838736 × 100.1385403103 × 104.1555669129
107.7081471617 × 112.0403086661 × 115.5015720253
119.6351685472 × 124.0206695649 × 127.4087787749
131.7817402673 × 135.9903003003 × 139.4144057508
143.7647575657 × 147.4345656236
```

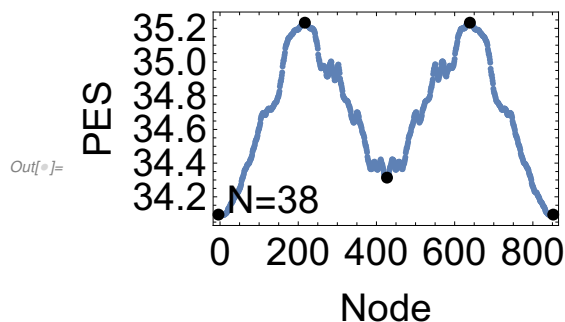
iMIN node427 energy = 34.31394291 detHess 734.327

```
0.5637124330 × 4.9835423581 × 8.4399096699
12.7294762478 × 17.1814262251 × 20.6381093564
25.0711769473 × 29.4427191393 × 32.8941419283
37.3412821629 × 41.4381801876 × 44.9725209379
49.3430104358 × 52.9164031456 × 56.9610145345
```

```

61.4063864232 × 64.8623000958 × 69.2144212836
73.6657618566 × 77.1301418603 × 81.5815697954
85.9333243140 × 89.3892367158 × 93.8344876334
97.8781122500 × 101.4522231012 × 105.8226971770
109.3563488860 × 113.4541428028 × 117.9012211000
121.3524822909 × 125.7243501286 × 130.1568247865
133.6132430208 × 138.0650993257 × 142.3527255609
145.8092665899 × 150.2282893312
SP node639 5.4749018404661523 E - 003 energy = 35.2336632 detHess - 173.481
3.3438642776 × 7.0223199638 × 11.3744242804
14.7974380145 × 19.0102777513 × 23.3831482633
26.7719603577 × 31.1584325252 × 35.2902467084
38.7531612624 × 43.0855067984 × 46.6365246056
50.6558418978 × 55.0556800303 × 58.4585437245
62.8044686153 × 67.1230124721 × 70.5289694529
74.9226482879 × 78.8584770540 × 82.4810108387
86.8206232603 × 90.2499510698 × 94.4346602292
98.8051641267 × 102.1876571822 × 106.5664634490
110.7001077308 × 114.1562472262 × 118.4842096464
122.0311434823 × 126.0495588545 × 130.4443235180
133.8414148356 × 138.1865625732 × 142.4882098571
145.8912693494 × 150.2758025226
gMin node852 energy34 .09448852 detHess 5.446573609 flat
6.7139027208 × 11.0138691762 × 14.3140029784
18.5985419910 × 22.6346947616 × 26.0708114707
30.3133466291 × 33.6635071590 × 37.7932583958
42.0170171678 × 45.3175808050 × 49.5905392837
53.2386448112 × 57.0543854074 × 61.3545613820
64.6591057310 × 68.9309449965 × 73.0197289512
76.4173492872 × 80.6666196889 × 84.0665207247
88.1527881909 × 92.4261406377 × 95.7307894800
100.0315875654 × 103.8535066324 × 107.4954624761
111.7672311752 × 115.0678266158 × 119.2896018735
123.4205833766 × 126.7691900204 × 131.0114780765
134.4489216539 × 138.4832096589 × 142.7679359107
146.0678538716 × 150.3676405421 o.k. good moved !

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

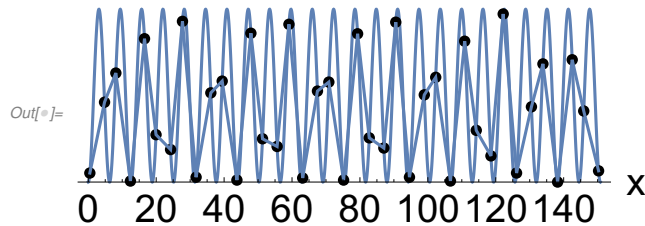
N = 39 GOLD a0 - min

ENERGY 35.007878358704

```
SetX = {0.4605601018700864, 4.788232423483259, 8.118779376122232,
 12.414471834905044, 16.558849006470442, 19.95136130785603,
 24.235898263033878, 27.73907499611334, 31.752315479143817,
 36.09563663888606, 39.439491734892385, 43.76900193752343,
 47.88683032416243, 51.31360883345937, 55.60687675844744,
 59.09153144150051, 63.139778834735516, 67.49110897456974,
 70.84385031300914, 75.18413310141473, 79.31195720406505,
 82.74211069158207, 87.044963205217, 90.55243770714152,
 94.5857918754905, 98.95075853305265, 102.31576950639973,
 106.6579683542979, 110.84461950899421, 114.25490630353318,
 118.58102354870726, 122.19013501103453, 126.12516036317514,
 130.5054365531175, 133.89406561899924, 138.2126966260449,
 142.5139483331213, 145.90561730780945, 150.28140817735812`}
```

Eigenvalues

```
Out[ ] = {4.27329, 4.25495, 4.22458, 4.18432, 4.13781, 4.06921, 3.99542, 3.91413, 3.83042,
 3.71589, 3.63064, 3.5441, 3.47368, 3.19658, 3.12799, 2.54697, 2.47036,
 2.36423, 2.24541, 2.13269, 2.00934, 1.89791, 1.81439, 1.56359, 1.49023,
 0.848208, 0.790916, 0.717184, 0.640266, 0.579516, 0.401252, 0.333667,
 0.268332, 0.222484, 0.194147, 0.0877182, 0.0507073, 0.0264237, 0.0129287}
```

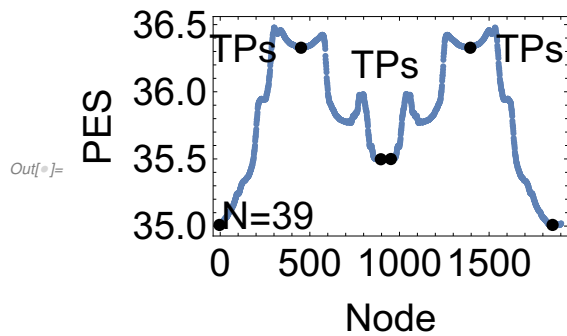


```

gMin node59 energy = 35.008726 detHess 298.33087898
0.5241731954 × 4.8987788259 × 8.2907048112
12.5887733285 × 16.9092426862 × 20.2972101134
24.6776051251 × 28.6184155695 × 32.2218936773
36.5468724295 × 39.9581747570 × 44.1418253237
48.4843282793 × 51.8488749801 × 56.2133423500
60.2487332424 × 63.7542324633 × 68.0567725341
71.4878062138 × 75.6141309765 × 79.9546894808
83.3073793969 × 87.6585476097 × 91.7084244291
95.1918135222 × 99.4851332934 × 102.9131114334
107.0296094517 × 111.3599035325 × 114.7040492398
119.0475499875 × 123.0641985920 × 126.5649239133
130.8497325413 × 134.2446261115 × 138.3867323214
142.6848541342 × 146.0159747142 × 150.3447784977
SP 371 energy = 36.327834 detHess - 670.331
0.5563357479 × 4.9772636871 × 8.4330663175
12.7258328627 × 17.1773867085 × 20.6340743865
25.0680102896 × 29.4372604488 × 32.8885427334
37.3350092193 × 41.4253648148 × 44.9638042567
49.3335796178 × 52.9005989079 × 56.9527170459
61.3979799586 × 64.8526022184 × 69.2076921013
73.6553031958 × 77.1176911177 × 81.5690478319
85.9082796628 × 89.3630783042 × 93.8030678738
97.8128597731 × 101.4117092970 × 105.7817717702
109.2933132084 × 113.4198891052 × 117.8634544792
121.3084629608 × 125.6903699146 × 130.0989374799
133.5456679891 × 137.9920070776 × 142.2025189743
145.6745264169 × 150.0638411410 × 153.7843464002
iMin node656 energy = 35.497703 detHess 7322.24
0.5822006668 × 5.0123427206 × 8.4871346156
12.7680924430 × 17.2494068124 × 20.7311519439
25.1649863867 × 29.6310604000 × 33.1199599880
37.5999966331 × 41.9810802704 × 45.4533735547
49.9206989263 × 54.0500313421 × 57.5797997491
61.9674493628 × 65.5943906265 × 69.5913746980
74.0468851868 × 77.5263800515 × 81.8545293843
86.3549356474 × 89.8560969557 × 94.3062712580
98.8149038636 × 102.3340688487 × 106.8263715543
111.3308952880 × 114.8544963246 × 119.3607817076
123.8473292436 × 127.3638804398 × 131.8720739743
136.3055198132 × 139.8008890863 × 144.2962583593
148.5763230602 × 152.0598974482 × 156.4966116008
node 670 energy = 35.49930176 detHess - 6061.210
node780 energy = 35.497377 detHess 10 729.15
node 836 energy = 35.501427 detHess - 9313.77
and node895 node1015

```



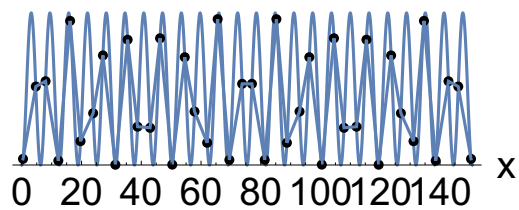


```

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
N = 40 GOLD a0 - min
ENERGY 36.01463128576
SetX = {0.40374388410958584, 4.679830104261491, 7.9564463003540205,
12.227817642095689, 16.16706651989229, 19.66317116414585,
23.88605089442332, 27.16099488301555, 31.333117507666483,
35.422525747312434, 38.75083460799093, 42.94742270512781,
46.284212528654976, 50.36543006359064, 54.546429029975634,
57.81906465347257, 62.04691865084575, 65.56799382178012,
69.48350318836877, 73.7591964165686, 77.03721679058876, 81.31291265556183,
85.22839542290221, 88.74949782963328, 92.9773574799229,
96.2499917368273, 100.43100055455407, 104.51221155804218,
107.8490105393044, 112.04560056481584, 115.37390553740704,
119.46332063791043, 123.6354405047294, 126.91038730492753,
131.13326719405114, 134.6293657440566, 138.56862237083723,
142.83999474362906, 146.11661253038903, 150.39270084631374}
Eigenvalues

```

Out[ ]:= {4.26381, 4.24557, 4.21746, 4.1761, 4.12717, 4.06144, 4.01056, 3.92106, 3.81798,  
3.73365, 3.63413, 3.54155, 3.43958, 3.38356, 3.05787, 3.0577, 2.46866,  
2.39225, 2.29663, 2.18606, 2.07445, 1.97394, 1.89163, 1.63762, 1.63737,  
0.919482, 0.872339, 0.783401, 0.69405, 0.618547, 0.500666, 0.491588, 0.322597,  
0.297363, 0.167445, 0.134145, 0.0778323, 0.0444941, 0.0358756, 0.0086}

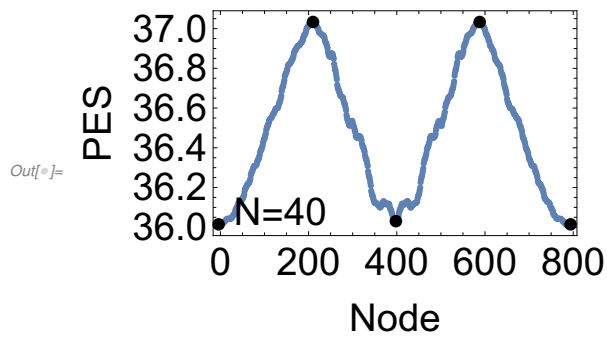


GlobMinA0gold

```

SP node210 energy = 37.0333849 detHess - 481.510462
0.4574576477 × 4.7849578865 × 8.1150900931
12.4113267208 × 16.5531398821 × 19.9468647186
24.2305729700 × 27.7296083429 × 31.7468270881
36.0889406907 × 39.4318293815 × 43.7616374500
47.8725721431 × 51.3028327853 × 55.5941533114
59.0694406492 × 63.1264301446 × 67.4737548065
70.8235626659 × 75.1639010129 × 79.2720551377
82.7116730053 × 87.0087257504 × 90.4889633809
94.5479742615 × 98.9026913029 × 102.2590597087
106.6030821983 × 110.7376003469 × 114.1675197888
118.4747281876 × 121.9950220708 × 126.0183376163
130.3888979551 × 133.7595402490 × 138.1010785141
142.3139760046 × 145.7179571432 × 150.0556683867
153.7185166668
iMin node398 energy = 36.0305345 detHess 519.406
0.5268251354 × 4.9219515849 × 8.3389560338
12.6406473665 × 17.0165471724 × 20.4266281355
24.8366894054 × 28.9550045992 × 32.4440053794
36.7893145197 × 40.3452443284 × 44.3766106717
48.7921514960 × 52.2124383101 × 56.5628074183
60.9273157089 × 64.3470005299 × 68.7651373522
72.8404693414 × 76.3645708367 × 80.7114875924
84.2335630693 × 88.3115329728 × 92.7295233538
96.1488936469 × 100.5142032833 × 104.8627520729
108.2828596234 × 112.6977608276 × 116.7236354505
120.2835607069 × 124.6286988644 × 128.1139709494
132.2368037524 × 136.6455047430 × 140.0543006168
144.4311552377 × 148.7259952543 × 152.1430877385
156.5351622932
SP node 588 energy = 37.033388 detHess - 547.50
3.3673241200 × 7.0271905230 × 11.3642971472
14.7686153526 × 18.9801068950 × 23.3217788847
26.6921523756 × 31.0624610561 × 35.0866186174
38.6060200624 × 42.9130239094 × 46.3431764184
50.4771153230 × 54.8211108418 × 58.1773681620
62.5319495098 × 66.5911027831 × 70.0711293591
74.3680993493 × 77.8077063461 × 81.9157538054
86.2560070207 × 89.6057383989 × 93.9529963928
98.0097219638 × 101.4851277945 × 105.7763635516
109.2063176252 × 113.3174898084 × 117.6470421727
120.9897981498 × 125.3318138250 × 129.3479968396
132.8477316023 × 137.1313152446 × 140.5242539829
144.6667648454 × 148.9621763644 × 152.2920970102
156.6191954721
gMin node794

```



Controll right border Node800 against begin : real moved by 2 Pi ok

node800 = {6.7859545788 × 11.0552756101 × 14.3263782361 ×

18.5796337458 × 22.5662328243 × 26.0089264128 ×

30.2199226636 × 33.5003352942 × 37.6517232350 ×

41.7557403023 × 45.0671729493 × 49.2628510129 ×

52.6156392311 × 56.6797906265 × 60.8746894696 ×

64.1433042389 × 68.3784771258 × 71.9419054893 ×

75.8148893599 × 80.0925868860 × 83.3704468721 ×

87.6413244667 × 91.5945333458 × 95.0785760124 ×

99.3010872904 × 102.5811506759 × 106.7484907655 ×

110.8502185664 × 114.1720653586 × 118.3733737404 ×

121.7293710692 × 125.7976492368 × 129.9994703502 ×

133.2713801796 × 137.5131093385 × 141.0977367654 ×

144.9528837265 × 149.2336278198 × 152.5144037273 ×

156.7843711249};

```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

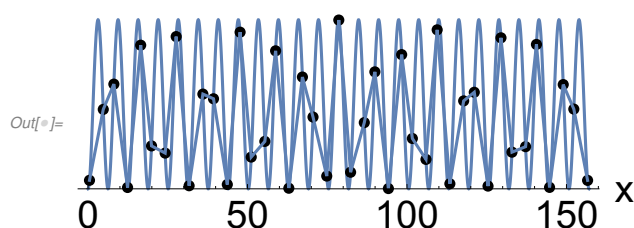
```
N = 41 GOLD a0 - min
```

```
ENERGY 36.849268899677
```

```
SetX = {0.45241575534260814, 4.772777355566163,
 8.09496177900842, 12.388250729224904, 16.504360160158864,
19.90562845468962, 24.177325484427868, 27.632468699353307,
31.686302388652354, 36.00722973493149, 39.335478988326024,
43.66157927786262, 47.67243164616065, 51.16184037582796,
55.432306920992055, 58.804264428912795, 62.95076742440822,
67.21590472727557, 70.53446200430115, 74.84158453333954,
78.62037117018089, 82.31868995479533, 86.61202125873554,
89.92906868570675, 94.16962078529669, 98.33209360717154,
101.68540616191761, 105.95328791716994, 109.46276473633576,
113.44549314938693, 117.76938812274557, 121.09409646074464,
125.40862916646117, 129.47084197293606, 132.91556828382963,
137.18443160886042, 140.58804676897267, 144.697512120224,
148.99018680570958, 152.31045534792815, 156.62911186577162`}
```

```
Eigenvalues
```

```
Out[ ] = {4.2693, 4.25382, 4.22564, 4.18637, 4.13664, 4.09534, 4.01628, 3.94255, 3.86234,
3.75645, 3.6689, 3.58819, 3.50392, 3.43621, 3.11755, 3.11512, 2.51574, 2.45072,
2.35181, 2.24734, 2.12486, 2.01985, 1.91624, 1.84574, 1.57721, 1.57464,
0.8744, 0.822356, 0.750467, 0.677539, 0.567322, 0.558041, 0.36256, 0.311279,
0.252165, 0.231334, 0.105671, 0.0907814, 0.0438356, 0.0309571, 0.00046258}
```



```
SP node256 energy = 38.0517470 detHess - 358.696
```

```
0.5410429540 × 4.9331890368 × 8.3496125787
12.6457049365 × 17.0210484219 × 20.4294160481
24.8377425982 × 28.9553306087 × 32.4433508803
36.7873413029 × 40.3407425624 × 44.3735359543
48.7876632504 × 52.2061098060 × 56.5569447990
60.9160567319 × 64.3340932166 × 68.7497806465
72.8082780398 × 76.3426847997 × 80.6872727267
84.1935723058 × 88.2885554388 × 92.7018627075
96.1154794532 × 100.4853431793 × 104.8096009941
108.2264639314 × 112.6307947622 × 116.5853261536
120.2003456026 × 124.5463913220 × 127.9935097278
132.1661477087 × 136.5562894365 × 139.9517300504
144.3358133159 × 148.5433776198 × 151.9748007274
156.3302013462 × 160.0043794023
node480 energy = 37.1578568 detHess 1103.5352
0.5996679913 × 5.0135641768 × 8.4724146341
12.7461213898 × 17.1986126202 × 20.6543115667
```

25.0827666441 × 29.4612675790 × 32.9125434177  
 37.3610695687 × 41.4779539952 × 44.9997595685  
 49.3723628948 × 52.9659197309 × 56.9864878691  
 61.4310227947 × 64.8899457310 × 69.2324935562  
 73.6922318222 × 77.1609837162 × 81.6114201884  
 85.9919245004 × 89.4519393157 × 93.9086020746  
 98.0324882818 × 101.5564443801 × 105.9354657905  
 109.5444992154 × 113.5533052750 × 118.0024589083  
 121.4700668829 × 125.8061593316 × 130.2842347885  
 133.7664821867 × 138.2179931320 × 142.6574206290  
 146.1370573660 × 150.6153477122 × 154.9135097754  
 158.3836927732 × 162.8185121619

node502 energy = 37.1592277 detHess - 247.927168  
 0.5313997899 × 4.9592013462 × 8.4172992351

12.7208857993 × 17.1783759679 × 20.6408920689  
 25.0791990533 × 29.4639884165 × 32.9205318764  
 37.3748860983 × 41.5106651784 × 45.0254121617  
 49.4041551255 × 53.0241724082 × 57.0178393622  
 61.4636538944 × 64.9299069252 × 69.2603634331  
 73.7356390053 × 77.2150301148 × 81.6643513932  
 86.0966158519 × 89.5725899265 × 94.0479565984  
 98.3248008230 × 101.7966137926 × 106.2222636216  
 110.0899745481 × 113.8238530185 × 118.2220024452  
 121.7039335756 × 125.9157695401 × 130.3770184693  
 133.8382374281 × 138.2485693419 × 142.6773979615  
 146.1409236830 × 150.6029788772 × 154.8727273181  
 158.3378485212 × 162.7546419577

node 508 energy = 37.15777249 detHess 305.076521  
 0.5759861454 × 4.9965068240 × 8.4570838610

12.7412987603 × 17.1995510822 × 20.6609367381  
 25.0935213679 × 29.4868960017 × 32.9437526865  
 37.3996908606 × 41.5606583277 × 45.0620989513  
 49.4454668080 × 53.0976204914 × 57.0544009454  
 61.4956350040 × 64.9642552643 × 69.2792781146  
 73.7578069766 × 77.2386775962 × 81.6834447412  
 86.1302476471 × 89.6114326685 × 94.0898378564  
 98.4109303236 × 101.8788035076 × 106.3220128273  
 110.2926741408 × 113.9327382287 × 118.3143786647  
 121.8206436893 × 125.9722655024 × 130.4275918764  
 133.8842066879 × 138.2744491776 × 142.7090577341  
 146.1706179154 × 150.6285103408 × 154.9192333198  
 158.3787478206 × 162.8015928905

node517 energy = 37.1589512 detHess - 411.085

0.5395403202 × 4.9703467184 × 8.4342401037  
 12.7344561015 × 17.2019694385 × 20.6724149535  
 25.1112921437 × 29.5287210746 × 32.9957121336  
 37.4627447798 × 41.6955860627 × 45.1738584185  
 49.5812268466 × 53.3563402804 × 57.1821868717  
 61.6002541213 × 65.0749289008 × 69.3323504108

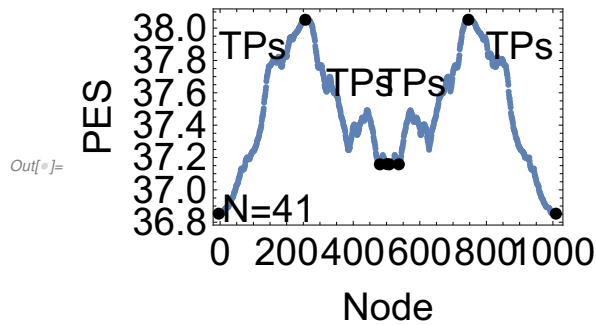
```

73.8054235660 × 77.2784286040 × 81.7041168075
86.1525118792 × 89.6295937468 × 94.1024581496
98.4304747482 × 101.8950066823 × 106.3384614915
110.3238634957 × 113.9493053821 × 118.3274107534
121.8364177565 × 125.9787470264 × 130.4309762890
133.8846123973 × 138.2717938111 × 142.7006917217
146.1584203747 × 150.6135306152 × 154.8867060769
158.3470882237 × 162.7618869063
node537 energy = 37.157757 detHess 1329.35624
0.6091238919 × 5.0323388686 × 8.5062458288
12.7749620996 × 17.2507609852 × 20.7269484461
25.1565023724 × 29.6098154375 × 33.0906860256
37.5661573137 × 41.9090654153 × 45.3754822041
49.8262065540 × 53.8516268159 × 57.4468756480
61.8243616428 × 65.3563500196 × 69.4670372150
73.9224993426 × 77.3824418728 × 81.7581432634
86.2105036580 × 89.6794961870 × 94.1382115876
98.4875615114 × 101.9462380734 × 106.3929258211
110.4307058662 × 114.0111757758 × 118.3835086941
121.9159600534 × 126.0181326161 × 130.4673772624
133.9207490049 × 138.2940318435 × 142.7312376212
146.1904897041 × 150.6441682732 × 154.9461342280
158.4022081393 × 162.8276424142
node746 energy = 38.0517755 detHess - 295.5537
3.3650107790 × 7.0367229009 × 11.3932614421
14.8264252369 × 19.0317312705 × 23.4182971540
26.8144180046 × 31.2044952117 × 35.3847106720
38.8287501827 × 43.1771842778 × 46.8043493186
50.7460502789 × 55.1502282529 × 58.5682959562
62.8881244238 × 67.2642143324 × 70.6763635254
75.0902947535 × 79.2006303874 × 82.6930152760
87.0351762708 × 90.5752166404 × 94.6229873186
99.0373041120 × 102.4545614522 × 106.8103758237
111.1624157542 × 114.5799286709 × 118.9936724170
123.0301194305 × 126.5798485463 × 130.9229062357
134.4117298113 × 138.5269162565 × 142.9346090288
146.3422060685 × 150.7167767338 × 155.0117403841
158.4271566561 × 162.8182790200
node1008 flat energy36 .8529481437 detHess 217.2
?BBP point crossed ?
6.6764598341 11.0200185518 × 14.3258365400
18.6382024969 × 22.7395462871 × 26.1511097160
30.4199629455 × 33.8477053515 × 37.9313551423
42.2462644395 × 45.5652508377 × 49.8877853715
53.8407939482 × 57.3703704541 × 61.6327413894
64.9633628258 × 69.1414628353 × 73.3459860350
76.6640901599 × 80.9367382039 × 84.5314263136
88.4155274234 × 92.7370383800 × 96.0584893839
100.3533775936 × 104.4714627315 × 107.8728426329

```

112.1466380866  $\times$  115.6052286524  $\times$  119.6579118615  
 123.9852178688  $\times$  127.3138129821  $\times$  131.6414266737  
 135.6679943639  $\times$  139.1461670999  $\times$  143.4189358840  
 146.8004563979  $\times$  150.9402162883  $\times$  155.2240864902  
 158.5391996583  $\times$  162.8564624307

all fit wonderful chain moved by 2 Pi ok



### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

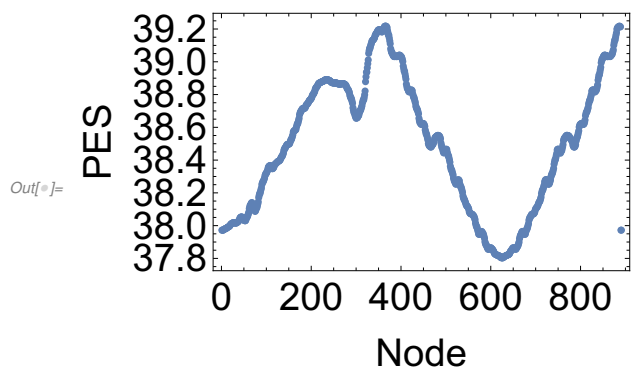
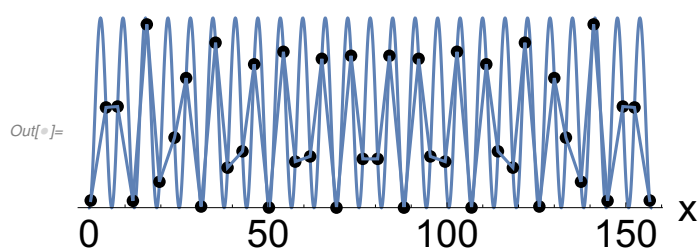
N = 42 GOLD a0 - min

ENERGY 37.97227891439

SetX = {0.3908495174345255, 4.655045622833523, 7.920885649766313,  
 12.18448845315426, 16.07542344763037, 19.60711214607916,  
 23.825948965920425, 27.07943282448446, 31.263096255056606,  
 35.29452332693444, 38.6538781000106, 42.829411346788376,  
 46.091005748105985, 50.21138033665894, 54.27767927053008,  
 57.579259766207315, 61.73844410622976, 65.0094299203208,  
 69.10190389875216, 73.18124367632451, 76.46219569430497,  
 80.61743805234245, 83.89839037363646, 87.97772930937376,  
 92.07020309335037, 95.34118861533834, 99.50037220380229,  
 102.80195182264744, 106.8682509875871, 110.98862453499578,  
 114.25021927788823, 118.42575226841838, 121.78510537020733,  
 125.81653405947087, 130.00019645809923, 133.25368095843544,  
 137.47251748351533, 141.0042039094214, 144.89514164752518,  
 149.15874466585942, 152.42458503474907, 156.68878209872656` }

Eigensystem

```
{ {4.261022591760878, 4.245828423150698, 4.219511600343321,
  4.182690746413888, 4.135796360056133, 4.079797299485825,
  4.018522547389518, 3.963969190952289, 3.850753437504851,
  3.7713965522596267, 3.681107653071377, 3.5869200404495705,
  3.492486219882743, 3.4028842569268445, 3.3267954007447362,
  3.0431458498980817, 3.043003687218761, 2.434526999807424,
  2.377499129471257, 2.287674726563339, 2.1853217990079212,
  2.0821047190465536, 1.9892471470322504, 1.9256644918521457,
  1.6526859543249688, 1.652535883763106, 0.9686949887965942,
  0.9026914772712334, 0.8230396329627743, 0.7357453858387387,
  0.6444750470677708, 0.5517448792330976, 0.4828122355221329,
  0.46605692061263776, 0.3264852386641337, 0.25050801518948124,
  0.18217527832873687, 0.12828269157623182, 0.08636731271803688,
  0.055489484642060535, 0.02775600925744779, 0.02590123647052997}, ...
```



```
gMin node627 energy = 37.8068320 detHess 310.34122
```

```
0.5205744827 × 4.8973319671 × 8.2911427151
12.5909106863 × 16.9152162665 × 20.3048791188
24.6878823542 × 28.6405550950 × 32.2351380440
36.5603286695 × 39.9773946115 × 44.1544584544
48.5028343979 × 51.8695575059 × 56.2357269283
60.2940383804 × 63.7845933093 × 68.0901546369
71.5410621302 × 75.6480165084 × 80.0021741034
83.3622054003 × 87.7161927864 × 91.8243253215
95.2744739124 × 99.5802149774 × 103.0721045404
107.1290104190 × 111.4955998416 × 114.8626678480
119.2108733277 × 123.3902438787 × 126.8064924028
131.1325344212 × 134.7312919844 × 138.6796945096
143.0627183428 × 146.4529638117 × 150.7759318847
155.0783859091 × 158.4720620528 × 162.8498729410
```

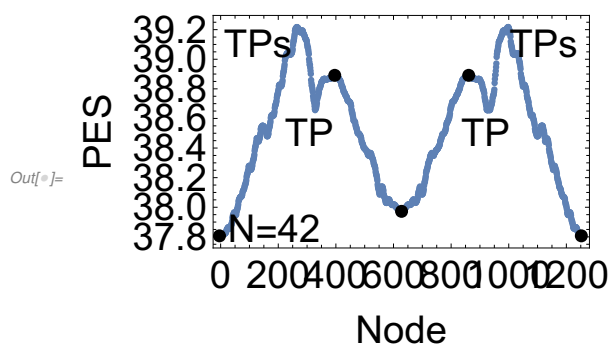


```

SP node396 energy = 38.8913855
3.4337876490 × 7.0292418947 × 11.3034442570
14.6246654261 × 18.8293939697 × 23.0139619274
26.3449528245 × 30.6123381706 × 34.1598720115
38.0946560262 × 42.4147504520 × 45.7348501577
50.0384775406 × 54.1170446300 × 57.5438010643
61.8093890394 × 65.2215819900 × 69.3167761904
73.6123425917 × 76.9309506872 × 81.2488342335
85.1475079933 × 88.7273408173 × 92.9980832598
96.3199368749 × 100.5187197699 × 104.7052578258
108.0331098764 × 112.2997032647 × 115.8505921886
119.7801299480 × 124.0987259878 × 127.4173389415
131.7192838186 × 135.7955811906 × 139.2222489941
143.4861326867 × 146.8941987705 × 150.9916616060
155.2831011456 × 158.5999108709 × 162.9154448265
iMin 628 energy = 37.9736059 detHess 1098.1088
6.6722168036 × 10.9363559674 × 14.2022480237
18.4660230536 × 22.3555990863 × 25.8887391689
30.1078943503 × 33.3613738514 × 37.5454887510
41.5765840980 × 44.9364400336 × 49.1121143318
52.3736540326 × 56.4942489380 × 60.5604518722
63.8622024288 × 68.0214317778 × 71.2923719821
75.3849389680 × 79.4642216266 × 82.7452415821
86.9004842541 × 90.1813695307 × 94.2607656762
98.3531475253 × 101.6241784596 × 105.7833179453
109.0847302669 × 113.1511240906 × 117.2712805424
120.5329293391 × 124.7083232708 × 128.0671823713
132.0989372278 × 136.2821527078 × 139.5356419982
143.7541632400 × 147.2844165204 × 151.1766937423
155.4401202174 × 158.7059067173 × 162.9701547237
SP 861 energy = 38.8931507 detHess - 103.7
6.7317420225 × 11.0471273721 × 14.3638412876
18.6549743866 × 22.7527515019 × 26.1604461985
30.4242561028 × 33.8511246457 × 37.9270884882
42.2290593164 × 45.5476264857 × 49.8661787110
53.7959539803 × 57.3465780172 × 61.6131006386
64.9409533554 × 69.1273855164 × 73.3261645010
76.6479670700 × 80.9186733102 × 84.4984777640
88.3971397748 × 92.7149849840 × 96.0335521710
100.3291008218 × 104.4241535528 × 107.8364006284
112.1019313533 × 115.5284831056 × 119.6072060939
123.9106779059 × 127.2307080533 × 131.5507310019
135.4848749306 × 139.0329273153 × 143.3003188762
146.6310594865 × 150.8158882725 × 155.0201567341
158.3414717008 × 162.6154378025 × 166.2096843714
gMin node1252 energy = 37.8064543 detHess 292.756438
6.7976686390 × 11.1752696572 × 14.5689724903
18.8708869112 × 23.1941307042 × 26.5842589596
30.9672819533 × 34.9165602939 × 38.5144619903

```

42.8403293956  $\times$  46.2567433410  $\times$  50.4356430775  
 54.7838834657  $\times$  58.1508805896  $\times$  62.5173842559  
 66.5745765425  $\times$  70.0661934134  $\times$  74.3718971102  
 77.8221987457  $\times$  81.9300920771  $\times$  86.2841131772  
 89.6441436262  $\times$  93.9982662940  $\times$  98.1054565881  
 101.5562110833  $\times$  105.8618075278  $\times$  109.3526279953  
 113.4106590145  $\times$  117.7769120461  $\times$  121.1437033582  
 125.4920454561  $\times$  129.6695686906  $\times$  133.0864704407  
 137.4118297949  $\times$  141.0072404011  $\times$  144.9590668688  
 149.3420775016  $\times$  152.7318580419  $\times$  157.0558999339  
 161.3562113081  $\times$  164.7499944285  $\times$  169.1269667306



\*\*\* \*\* \*\* \*\* \*\*

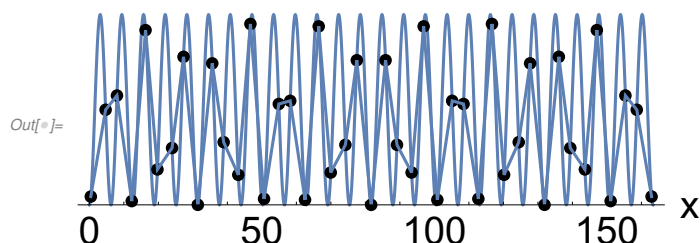
N = 43 GOLD a0 - min

ENERGY 38.7427928422966

SetX = {0.4207349736337198, 4.7123885324457815, 8.004041784139103,  
12.284457117997505, 16.28667838958256, 19.741950686950133,  
23.975799860182057, 27.294071495725156, 31.442986611715966,  
35.618958542279316, 38.92187202806851, 43.164829623527034,  
46.67837115271066, 50.62283854053387, 54.91710456337586,  
58.21321615171086, 62.50493601332437, 66.47553107889681,  
69.96487136291412, 74.20538176209587, 77.51647086986591,  
81.68141392100942, 85.8463617965381, 89.15744778930048, 93.39795981717195,  
96.88731007841248, 100.85789450420184, 105.14961588150106,  
108.44572723166402, 112.73999202566021, 116.68446992668035,  
120.19800090931284, 124.44095640398768, 127.7438712651737,  
131.9198384974925, 136.06875598323742, 139.3870246554027,  
143.62087330533674, 147.0761490285065, 151.0783654071061,  
155.35878018538904, 158.65043227518402, 162.9420844145138`}

Eigenvalues

Out[\*]= {4.26694, 4.25167, 4.2256, 4.19275, 4.14777, 4.09049, 4.04753,  
3.96793, 3.89244, 3.79375, 3.71626, 3.62868, 3.53122, 3.46329, 3.40452,  
3.07804, 3.07796, 2.49294, 2.42863, 2.33966, 2.23851, 2.13176, 2.02861,  
1.93651, 1.86676, 1.61645, 1.61632, 0.900874, 0.853284, 0.790027,  
0.711133, 0.636778, 0.522564, 0.516052, 0.340139, 0.294374, 0.270735,  
0.139064, 0.104175, 0.0717841, 0.0541623, 0.0229923, 0.0105918}



SP node237 energy = 39.828489 detHess - 429.2288

0.5093414255 × 4.8871250839 × 8.2801362912

12.5837095351 × 16.9046208309 × 20.2947094028

24.6769152903 × 28.6189171057 × 32.2231144915

36.5496572902 × 39.9636590928 × 44.1465138886

48.4928483413 × 51.8594829834 × 56.2258484202

60.2749723286 × 63.7721370613 × 68.0770273555

71.5205219879 × 75.6354260868 × 79.9853144709

83.3430424094 × 87.6966474956 × 91.7855005156

95.2460944155 × 99.5472475926 × 103.0158385098

107.0949510655 × 111.4511888360 × 114.8102641024

119.1592555739 × 123.2887828310 × 126.7245698219

131.0331341979 × 134.5498944143 × 138.5795804764

142.9516981104 × 146.3238583624 × 150.6674041174

154.8822644610 × 158.2870823961 × 162.6266129916

node478 energy = 38.8631975 detHess 521.6280

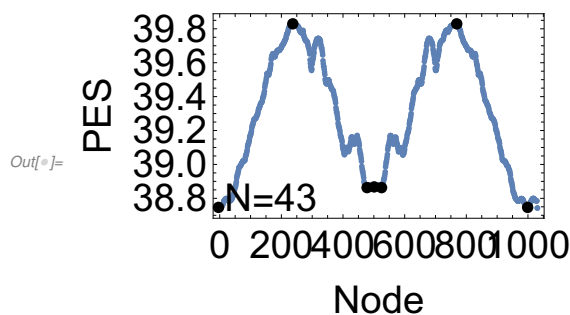
$0.5445377567 \times 4.9375415959 \times 8.3557853889$   
 $12.6507455505 \times 17.0299805711 \times 20.4400018179$   
 $24.8498300181 \times 28.9805059101 \times 32.4622557879$   
 $36.8095965935 \times 40.3801708505 \times 44.3951713263$   
 $48.8114154466 \times 52.2344647012 \times 56.5792798711$   
 $60.9547023665 \times 64.3766854947 \times 68.7983315796$   
 $72.9085388268 \times 76.4120420064 \times 80.7644016671$   
 $84.3229762897 \times 88.3609987039 \times 92.7851251865$   
 $96.2150933086 \times 100.5674730347 \times 104.9563527713$   
 $108.3861354073 \times 112.8159173366 \times 116.9679809339$   
 $120.4538810609 \times 124.8185900621 \times 128.4352509093$   
 $132.4135718352 \times 136.8418168927 \times 140.2866755233$   
 $144.6158347147 \times 149.0473867865 \times 152.4947858988$   
 $156.9340625244 \times 161.2282825720 \times 164.6772395784$   
 $169.0935121957$   
501 energy = 38.8674531 detHess - 61.09524  
 $0.5339385320 \times 4.9347332380 \times 8.3601447622$   
 $12.6601674389 \times 17.0538494655 \times 20.4727173384$   
 $24.8902144731 \times 29.0675554091 \times 32.5322793062$   
 $36.8955086284 \times 40.5388761379 \times 44.4795100571$   
 $48.8971217516 \times 52.3351536579 \times 56.6513069848$   
 $61.0699194128 \times 64.5067430360 \times 68.9381538068$   
 $73.1936009620 \times 76.6432808207 \times 81.0403751162$   
 $84.8394450213 \times 88.6220722930 \times 93.0158221026$   
 $96.4664306443 \times 100.7144194521 \times 105.1448354831$   
 $108.5801005289 \times 112.9963833965 \times 117.3118855167$   
 $120.7487710830 \times 125.1652142230 \times 129.1035558332$   
 $132.7480428019 \times 137.1106875398 \times 140.5734981104$   
 $144.7523895064 \times 149.1681358890 \times 152.5855358123$   
 $156.9792044729 \times 161.2726136588 \times 164.6979096645$   
 $169.0955556976$   
node525 energy = 38.863695 detHess 627.32534  
 $1.40.5507519907 \times 4.9673274204 \times 8.4162240281$   
 $12.7111824888 \times 17.1504472254 \times 20.5979327058$   
 $25.0296921685 \times 29.3585848556 \times 32.8035241064$   
 $37.2317293457 \times 41.2093835306 \times 44.8266541715$   
 $49.1914690048 \times 52.6771634482 \times 56.8296616973$   
 $61.2594706828 \times 64.6892809260 \times 69.0782928288$   
 $73.4305674500 \times 76.8605628112 \times 81.2846824532$   
 $85.3224008900 \times 88.8812210885 \times 93.2335948247$   
 $96.7369184161 \times 100.8473800556 \times 105.2690033665$   
 $108.6909556070 \times 113.0664513012 \times 117.4110676769$   
 $120.8341008356 \times 125.2502720228 \times 129.2646867350$   
 $132.8357018631 \times 137.1830394484 \times 140.6644317619$   
 $144.7955605009 \times 149.2052530808 \times 152.6151536920$   
 $156.9944816844 \times 161.2887615449 \times 164.7070264868$   
 $169.0997300528$   
769 energy = 39.8293950 detHess - 442.99556  
 $3.3811764027 \times 7.0348960833 \times 11.3715052817$

14.7779482589 × 18.9860201499 × 23.3301331128  
 26.7009943258 × 31.0718523048 × 35.1053849698  
 38.6180510694 × 42.9256757036 × 46.3626015114  
 50.4893819932 × 54.8381959761 × 58.1967487279  
 62.5523165084 × 66.6319740581 × 70.0996780252  
 74.4004548022 × 77.8609681649 × 81.9493785069  
 86.3025628134 × 89.6599061609 × 94.0095074600  
 98.1230848152 × 101.5670306373 × 105.8713824065  
 109.3665467462 × 113.4174039604 × 117.7828926916  
 121.1487413745 × 125.4951651137 × 129.6738446221  
 133.0891336920 × 137.4139903206 × 141.0103766273  
 144.9602467852 × 149.3423654039 × 152.7312874150  
 157.0546741050 × 161.3531048117 × 164.7463230289  
 169.1220534430

999 energy = 38.7465478 detHess 174.47582

6.6947500480 × 10.9870615378 × 14.2794092608  
 18.5616575906 × 22.5599682368 × 26.0196409380  
 30.2544302950 × 33.5718200615 × 37.7228682369  
 41.8976705715 × 45.2016046377 × 49.4443998561  
 52.9553110999 × 56.9027755989 × 61.1969937888  
 64.4932633082 × 68.7854301956 × 72.7539247546  
 76.2453705101 × 80.4862105672 × 83.7967621634  
 87.9626707068 × 92.1266556577 × 95.4382873767  
 99.6784766607 × 103.1657456611 × 107.1384070419  
 111.4296728452 × 114.7256265268 × 119.0199278451  
 122.9614000134 × 126.4775783441 × 130.7207082888  
 134.0226320249 × 138.1997572076 × 142.3465674852  
 145.6657330766 × 149.8986691979 × 153.3496614508  
 157.3556666880 × 161.6342138725 × 164.9251868868  
 169.2161243905

ok movement to 2 Pi

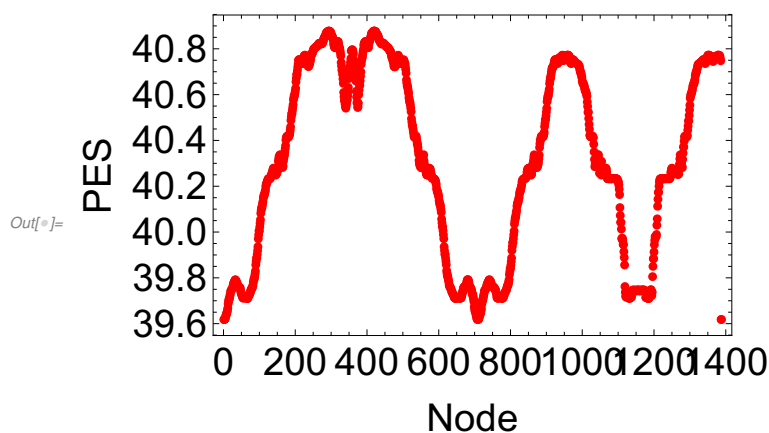
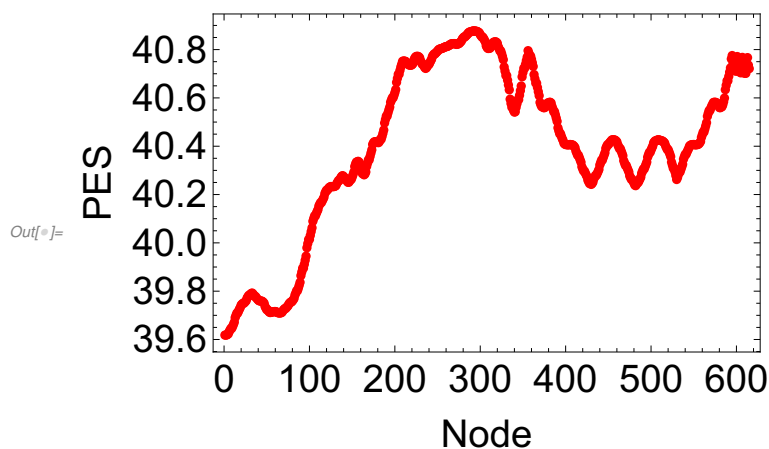
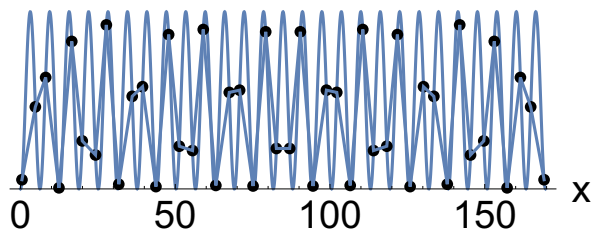


```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

N = 44 GOLD a0 - min : there is a Min but no ? MEP across PES

ENERGY 39.61816477519

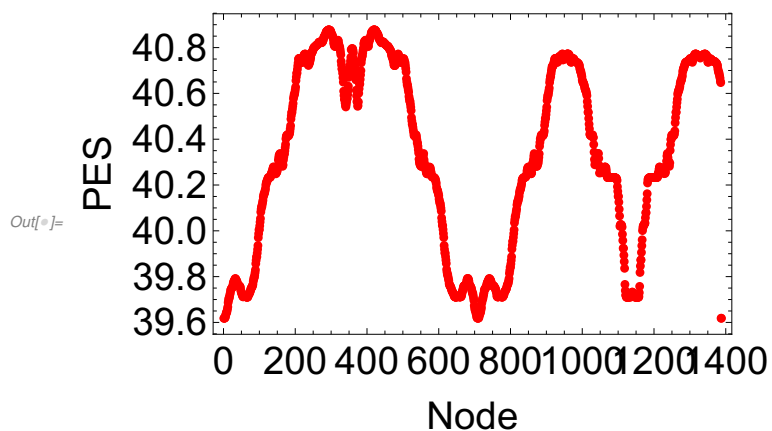
```
SetX = {0.4593610816008772, 4.785958648445311, 8.11526139400955,
12.410624252397358, 16.550869795620972, 19.944535234483215,
24.227119183439946, 27.722893859130437, 31.742582866241296,
36.08315004421913, 39.42473702802039, 43.75436195574428,
47.85801993818595, 51.291736288873324, 55.58081710100563,
59.0462290324887, 63.11206512398964, 67.45446050626896, 70.80088368503857,
75.14069598962647, 79.22581778171579, 82.67749129127286,
86.96851262846599, 90.42018656350338, 94.50530786425921, 98.8451203110244,
102.19154357785415, 106.53393913526762, 110.59977605010832,
114.06518734601278, 118.35426835619289, 121.7879858090677,
125.89164308545499, 130.22126864788703, 133.56285557683023,
137.90342293334874, 141.92311448684885, 145.4188721586596,
149.70147089077673, 153.09513704906269, 157.2353807792889,
161.53074349684076, 164.86004559959338, 169.1866426991606` }
```



```

SP node295 energy = 40.87767907 detHess - 799.01
0.5347080739 × 4.9291379769 × 8.3469661236
12.6457186235 × 17.0237358947 × 20.4340958487
24.8443613609 × 28.9702275044 × 32.4550221144
36.8017627625 × 40.3668270893 × 44.3882312619
48.8045125670 × 52.2268187357 × 56.5738285461
60.9459964833 × 64.3673867134 × 68.7881552795
72.8878311062 × 76.3973929070 × 80.7479765303
84.2948928960 × 88.3457099167 × 92.7684832090
96.1954397001 × 100.5522195511 × 104.9302524381
108.3569024603 × 112.7831592728 × 116.9003829315
120.4033411472 × 124.7598800487 × 128.3307194412
132.3585231647 × 136.7864321639 × 140.2224140591
144.5708554625 × 148.9768584288 × 152.4136509684
156.8493668839 × 161.0568464876 × 164.5226128176
168.9051003050 × 172.6126333268
iMin ? node421 or SP back ? energy = 40.8777079 detHess - 894.00384
0.5300228341 × 4.9252746036 × 8.3431010662
12.6436744633 × 17.0214747392 × 20.4321905892
24.8428363667 × 28.9676210859 × 32.4533368239
36.8001429339 × 40.3642634870 × 44.3870034914
48.8034923366 × 52.2258947395 × 56.5733521433
60.9454914192 × 64.3670096154 × 68.7878927817
72.8874346218 × 76.3971825721 × 80.7478385349
84.2947451295 × 88.3456800087 × 92.7685433972
96.1955954857 × 100.5524135929 × 104.9306787337
108.3574297924 × 112.7838022890 × 116.9017532371
120.4043580119 × 124.7610727775 × 128.3328264247
132.3596692598 × 136.7876674683 × 140.2238959780
144.5719766416 × 148.9787381522 × 152.4158280968
156.8517380517 × 161.0617209170 × 164.5267299699
168.9100973220 × 172.6222057159
gMin node711 energy = 39.6261711657 detHess 1010.0
0.4532142898 × 4.7806196961 × 8.1103519147
12.4074008737 × 16.5461488105 × 19.9414659354
24.2242917103 × 27.7185662957 × 31.7404363982
36.0811507688 × 39.4229771899 × 43.7531114045
47.8560609831 × 51.2905245926 × 55.5797242630
59.0446359185 × 63.1112449328 × 67.4536250892
70.8001081539 × 75.1400691102 × 79.2247333506
82.6767888500 × 86.9678100882 × 90.4191021870
94.5046804046 × 98.8443429055 × 102.1907057050
106.5331155528 × 110.5981755257 × 114.0640906078
118.3530527112 × 121.7860220287 × 125.8903877818
130.2194988318 × 133.5608460454 × 137.9012620856
141.9187566948 × 145.4160494513 × 149.6983987391
153.0904274955 × 157.2321588277 × 161.5258255951
164.8547138124 × 169.1804909995
is start thus no Result! Remainder max TP ?

```



```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

```
N = 44 GOLD SP
```

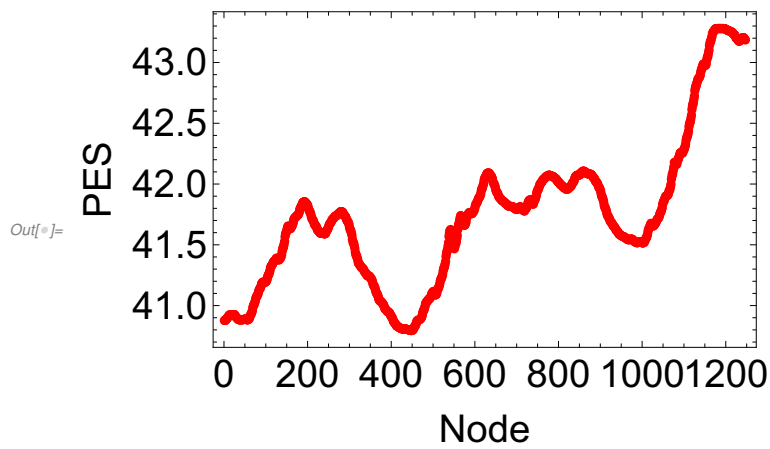
```
Setxx = node295
```

```
Out[""] = {0.53627, 4.93043, 8.34826, 12.6464, 17.0245, 20.4347, 24.8449, 28.9711, 32.4556,
36.8023, 40.3677, 44.3886, 48.8049, 52.2271, 56.574, 60.9462, 64.3675, 68.7882,
72.888, 76.3975, 80.748, 84.2949, 88.3457, 92.7685, 96.1954, 100.552, 104.93,
108.357, 112.783, 116.9, 120.403, 124.759, 128.33, 132.358, 136.786, 140.222,
144.57, 148.976, 152.413, 156.849, 161.055, 164.521, 168.903, 172.609}
```

Eigensystem



```
{4.2833428601619215, 4.269885708015652,
 4.248646452414736, 4.219649286915898, 4.1713514786064465,
 4.1230245762837985, 4.06722925795711, 4.000397211892372,
 3.9344701684297343, 3.8608407989878653, 3.786164312990724,
 3.694375802421398, 3.6307608738761594, 3.570389779555706,
 3.526528163387193, 3.224283828048524, 2.6168163728628864,
 2.564612646156748, 2.488775330638153, 2.3850849894976376,
 2.2849953966467225, 2.1760458069400492, 2.0676946945241443,
 1.9775467825167259, 1.8634153545004994, 1.7885243483667685,
 1.737676053578685, 1.459097495433567, 0.8161002961002932,
 0.7826722502135603, 0.7440461387411501, 0.6788065758665218,
 0.49508081771790957, 0.44118490084224016, 0.38269016570831704,
 -0.3674773640940554, 0.3071382531764848, 0.24776380218706429,
 0.1986686551644654, 0.1622958286355276, 0.14441528116063385,
 0.03748771431759845, 0.022396309173674744, 0.013104601459538}, ..
```

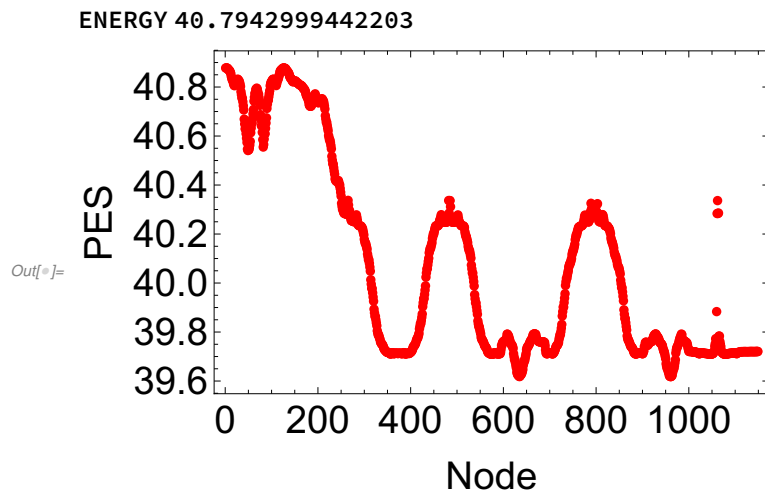


parallel SP node 41 ?  
 and node57 and node 194  
 node449 energy = 40.794942606 detHess - 67.3195  
 it is compressed may be iMin ? no compressed SP !  
 node449 = {6.6943132610, 10.9849353390, 14.2756140101,  
 18.5567241841, 22.5491697882, 26.0121067705,  
 30.2453782309, 33.5576853098, 37.7113736067,  
 41.8773233601, 45.1825854123, 49.4199909657,  
 52.9090992788, 56.8758557753, 61.1639937614,  
 64.4568386619, 68.7482156834, 72.6809413811,  
 76.2019746943, 80.4429723981, 83.7386950462,  
 87.9183971392, 92.0519185014, 95.3745146480,  
 99.6001251390, 103.0236139253, 107.0514478312,  
 111.3143585640, 114.5996952827, 118.8826911330,  
 122.6881671867, 126.3283516150, 130.5853161528,  
 133.8640876884, 138.0834603094, 142.1567412048,  
 145.5231461352, 149.7363212460, 153.0770792217,  
 157.1763062751, 161.3720564126, 164.6547034396,  
 168.8987063210, 172.4630507050};  
 and nodes 634 × 989 × 1003 × 1188 and further

N = 44 GOLD is SP , no iMin ?  
 node449  
 SetX = {6.702181782864565, 10.992247801255921,  
 14.282319352397755, 18.561874775648445, 22.55770076834605,  
 26.01680062585129, 30.249219454299336, 33.56217741233835,  
 37.71408038620018, 41.880951344222424, 45.1852931420445,  
 49.42275546209342, 52.913757265178454, 56.878309805128936,  
 61.166566707888606, 64.45928447370424, 68.750398902285,  
 72.68490083296905, 76.20410527658238, 80.44475112323018,  
 83.74070376189918, 87.91969493640089, 92.05380183110258,  
 95.37588291909842, 99.60156532938827, 103.02598689146424,  
 107.05286127757597, 111.31618609228663, 114.60155366255208,  
 118.884705723458, 122.69210901708621, 126.33033437008645,  
 130.58689931605812, 133.865601305346, 138.08438940899717,  
 142.15800498127402, 145.52385123676277, 149.736842547123,  
 153.07767163318223, 157.17658358391841, 161.3722946291342,  
 164.65480546198813, 168.8987002319085, 172.4629320379113}

### Eigenvalues

Out[\*]= {4.26654, 4.25224, 4.22823, 4.19694, 4.15506, 4.10547, 4.05641, 3.97871,  
 3.90837, 3.82237, 3.74778, 3.66518, 3.5817, 3.4972, 3.43525, 3.3903,  
 3.07589, 2.49127, 2.43749, 2.36153, 2.27049, 2.17431, 2.07964, 1.98892,  
 1.91604, 1.86494, 1.6186, 0.909327, 0.868477, 0.813774, 0.736177,  
 0.66617, 0.608055, 0.516496, 0.340308, -0.33807, 0.303099, 0.278941,  
 0.147149, 0.114051, 0.0877291, 0.0547014, 0.0174885, 0.00357781}

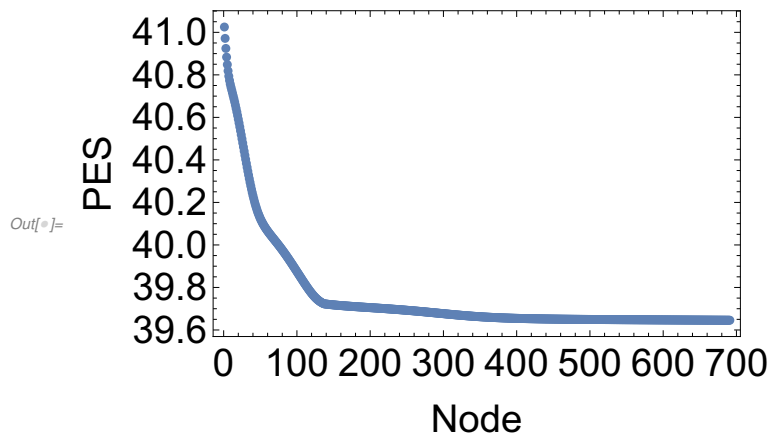
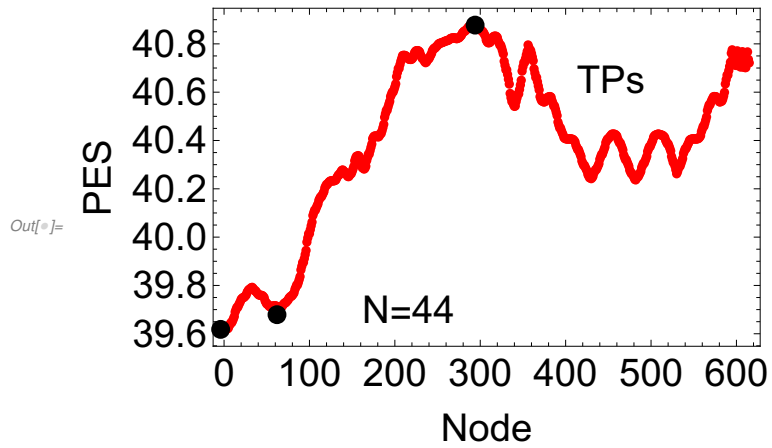


node128 energy = 40.87692525 detHess - 676.94270172 is again SP

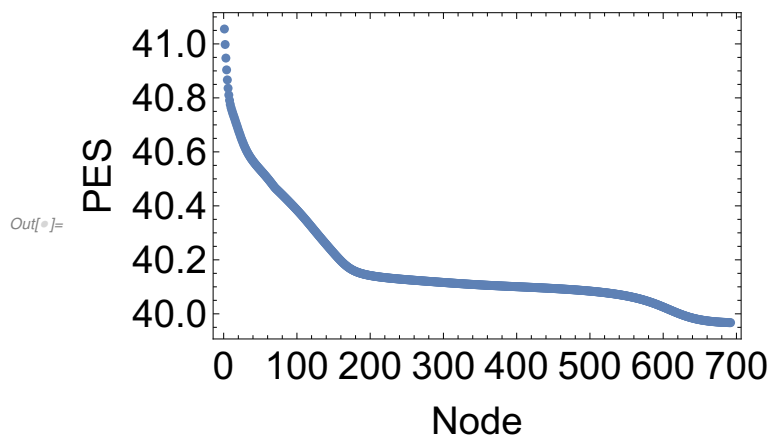
Rest is garbage

636 gMin ok

962 ok gMin



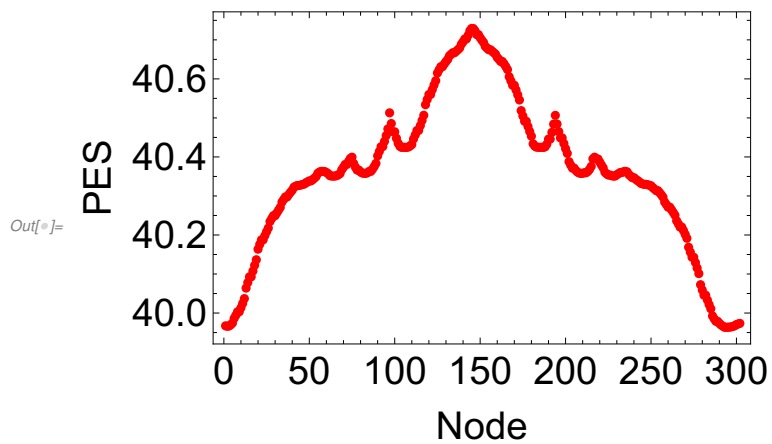
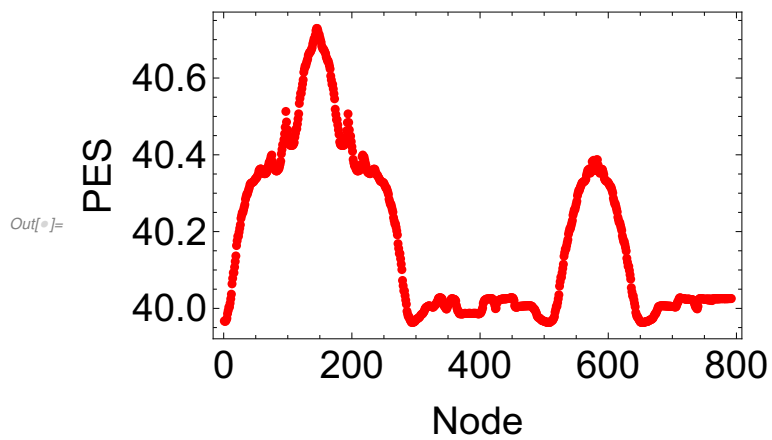
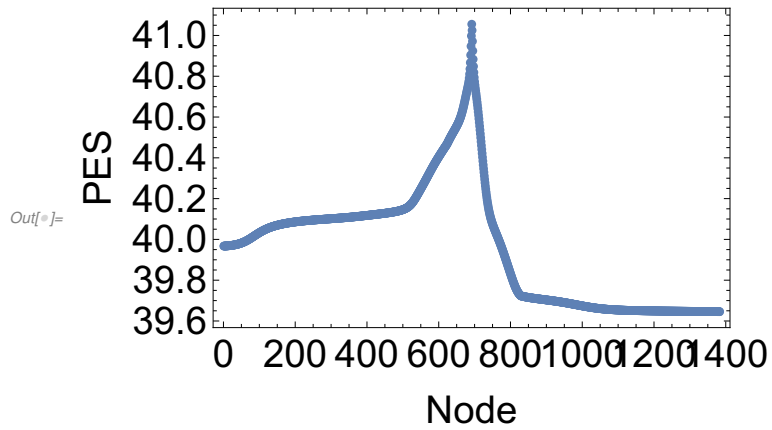
Out[\*]= {0.399459, 4.67257, 7.9436, 12.2151, 16.1332, 19.6445, 23.8564, 27.1236, 31.2902, 35.3518, 38.6848, 42.8706, 46.1383, 50.2552, 54.3324, 57.6268, 61.7768, 65.0791, 69.1395, 73.2518, 76.5031, 80.6683, 83.9592, 88.0231, 92.1158, 95.3744, 99.5133, 102.817, 106.858, 110.96, 114.202, 118.35, 121.623, 125.686, 129.754, 133.015, 137.142, 140.389, 144.461, 148.487, 151.769, 155.879, 159.055, 163.15}



```

In[ ]:= xxx = Join[Reverse[wegIRC44DSPneu2], wegIRC44DSPneu];
energy44Dirc = ListPlot[xxx, PlotRange -> All, PlotStyle -> {PointSize[0.017]},
  ImageSize -> Automatic, FrameStyle -> Directive[20],
  FrameLabel -> {"Node", "PES"}, Axes -> False, Frame -> True]

```



```

SP node294 energy = 40.87764 detHess - 709.926
Setxx = {0.5405198213, 4.9339266509, 8.3517727501,
12.6482582647, 17.0265399429, 20.4364607364,
24.8462517911, 28.9734563506, 32.4571146441,
36.8037780005, 40.3700234944, 44.3897623287,
48.8057844751, 52.2279716974, 56.5744230286,
60.9466267765, 64.3678576948, 68.7884834428,
72.8883272551, 76.3976565632, 80.7481503030,
84.2950802058, 88.3457489637, 92.7684102384,
96.1952480470, 100.5519797280, 104.9297246754,
108.356249447, 112.7823624851, 116.8986846816,
120.4020824084, 124.7584043914, 128.3281148674,
132.3571048512, 136.7848998679, 140.2205746358,
144.5694599991, 148.9745137201, 152.4109370248,
156.8464059281, 161.0507567206, 164.5174924783,
168.8988916680, 172.6007683294};

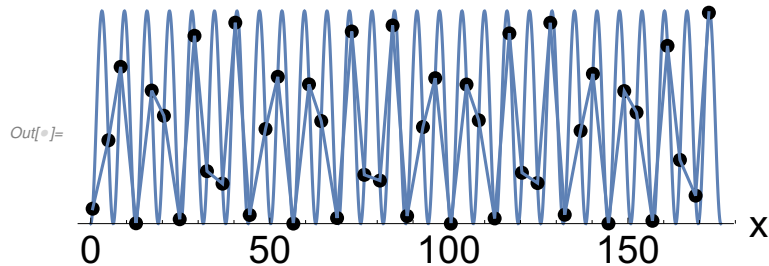
N = 44 GOLD a0 - SP suche : ist INDEX 1 ok
as = 6.283185307180;
a0 = 2. / (1. + Sqrt[5.]) * as;
Setxx = Table[a0 * (i - 1), {i, 44}];
...
G2G2G2 = Sum[GGG[[i]]^2, {i, 44}];
NMinimize[G2G2G2, SetFin]

SetX = {0.5362700836501676, 4.930425402141679,
8.348256641991867, 12.646400754525098, 17.02448960476002,
20.43473127548884, 24.844869569787853, 28.971095754895206,
32.45558428234932, 36.80230373086081, 40.367684365961146,
44.38864186968177, 48.80485371200125, 52.22712786711773,
56.57398793725076, 60.94616547459754, 64.36751295243063,
68.7882432088435, 72.88796400054133, 76.39746348322068,
80.74802296820249, 84.29494283062832, 88.34572021581236,
92.76846343280334, 96.19538804163068, 100.55215501989916,
104.93011051743024, 108.3567268727905, 112.78294507951559,
116.89992643073542, 120.40300262750146, 124.7594831056502,
128.3300185844283, 132.3581416835891, 136.7860204134567,
140.22191990977282, 144.57048099233108, 148.9762297846857,
152.4129231352388, 156.84857336175088, 161.05521477074976,
164.5212383133077, 168.90343299500265, 172.60944390959375` }

```

## Eigenvalues

```
Out[ ]:= {4.28334, 4.26989, 4.24865, 4.21965, 4.17135, 4.12302, 4.06723,
  4.0004, 3.93447, 3.86084, 3.78616, 3.69438, 3.63076, 3.57039, 3.52653,
  3.22428, 2.61682, 2.56461, 2.48878, 2.38508, 2.285, 2.17605, 2.06769,
  1.97755, 1.86342, 1.78852, 1.73768, 1.4591, 0.8161, 0.782672, 0.744046,
  0.678807, 0.495081, 0.441185, 0.38269, -0.367477, 0.307138, 0.247764,
  0.198669, 0.162296, 0.144415, 0.0374877, 0.0223963, 0.0131046}
```



## Eigensystem

```
{{4.2833428601619215, 4.269885708015652,
  4.248646452414735, 4.219649286915896, 4.1713514786064465,
  4.123024576283799, 4.06722925795711, 4.000397211892371,
  3.9344701684297343, 3.860840798987865, 3.786164312990723,
  3.6943758024213977, 3.6307608738761594, 3.5703897795557085,
  3.5265281633871934, 3.2242838280485175, 2.6168163728628855,
  2.5646126461567498, 2.488775330638151, 2.385084989497634,
  2.284995396646721, 2.1760458069400492, 2.067694694524145,
  1.9775467825167272, 1.8634153545004986, 1.78852434836676,
  1.7376760535786833, 1.4590974954335754, 0.8161002961002914,
  0.7826722502135595, 0.7440461387411483, 0.6788065758665169,
  0.4950808177179091, 0.4411849008422468, 0.3826901657083184,
  -0.36747736409405984, 0.3071382531764768, 0.2477638021870634,
  0.1986686551644672, 0.16229582863552583, 0.14441528116063207,
  0.037487714317597565, 0.022396309173678297, 0.01310460145953},
```

no 9 ev :

```
{5.799145336163677`*^-13, 1.2915263581819209`*^-12, 2.7571187644171146`*^-12,
  3.9279305311059634`*^-12, 1.0457526248597377`*^-11,
  1.8199551104514043`*^-11, 3.236781620612034`*^-11, 8.94664116457696`*^-11,
  1.1082792910535007`*^-10, 2.2905225338640217`*^-10, 5.74401231093081`*^-10,
  6.194997232475594`*^-10, 1.4613052681045235`*^-9, 3.000770435551732`*^-9,
  4.4997364899915564`*^-9, 1.2150548000343198`*^-8, 2.050322709954934`*^-8,
  3.711064036010756`*^-8, 1.0250197023616585`*^-7, 1.228166118340999`*^-7,
  2.5470022200686317`*^-7, 6.317566406851373`*^-7, 6.952662916915344`*^-7,
  1.6596490145166997`*^-6, 3.3855284542320935`*^-6, 5.1097803275292585`*^-6,
  0.000013820393978952432, 0.00002335099316511983, 0.00004212142377466155,
  0.00011642736850071867, 0.0001416123233895064, 0.0002926519667590292,
  0.0007321802456350064, 0.0007897394838315296, 0.001861402494936127,
  0.003852371832397658, 0.005684474326110476, 0.015280663825657686,
  0.026720223886726867, 0.046758721058847326, 0.1294960673594357,
  0.1728084522330855, 0.3488834611585937, 0.9101992037129135`},
```

node92 SP and nodes 274 × 468 flat end to 505 then stagnation

N = 44 The NT finds an index one SP with a usual barrier hight however then the NT goes after some zigzagging below the SP hight up into the PES mountains.

It means that the chain suffers on a ' traffic jam ' of some of its particles.

The jam causes a higher energy for  
a row of particles on a narrow region of the chain.

after node 600 not convergent

node92 energy = 39.66128677 detHess 0.67786781544011931

? BBP point crossed ?

node92 = {0.5121605828 × 4.8854445110 × 8.2736652142 ×  
12.5751038355 × 16.8852755669 × 20.2718684363 ×  
24.6474578233 × 28.5565881478 × 32.1871970537 ×  
36.5148527544 × 39.9162884411 × 44.1159933169 ×  
48.4489964194 × 51.8120297215 × 56.1747690295 ×  
60.1722607657 × 63.7061999533 × 68.0072638327 ×  
71.4136208171 × 75.5666267517 × 79.8872409060 ×  
83.2326989749 × 87.5779668012 × 91.5461676249 ×  
95.0884464718 × 99.3758133800 × 102.7483241315 ×  
106.9189928476 × 111.1943101622 × 114.5243060699 ×  
118.8439665891 × 122.6524371147 × 126.3309267780 ×  
130.6281568749 × 133.9569169831 × 138.1905924889 ×  
142.3844539301 × 145.7295040593 × 150.0110066481 ×  
153.5830137294 × 157.4985083742 × 161.8093058233 ×  
165.1049985930 × 169.3552445526};

node 272 SP energy = 40.877215 detHess - 783.973 ! IRC to new Min?

SP272 = { 0.5362699768 × 4.9304253114 × 8.3482565478 ×  
12.6464007016 × 17.0244895403 × 20.4347312157 ×  
24.8448695155 × 28.9710956541 × 32.4555842123 ×  
36.8023036562 × 40.3676842400 × 44.3886418046 ×  
48.8048536479 × 52.2271277970 × 56.5739878879 ×  
60.9461653965 × 64.3675128699 × 68.7882431189 ×  
72.8879638180 × 76.3974633554 × 80.7480228260 ×  
84.2949425895 × 88.3457200840 × 92.7684632880 ×  
96.1953878705 × 100.5521548855 × 104.9301102854 ×  
108.3567265959 × 112.7829447184 × 116.8999255849 ×  
120.4030018072 × 124.7594816917 × 128.3300153068 ×  
132.3581384662 × 136.7860132389 × 140.2219053535 ×  
144.5704597925 × 148.9761730871 × 152.4128242673 ×  
156.8484006897 × 161.0547369660 × 164.5206013454 ×  
168.9021476376 × 172.6060918343};

node345 iMin flach? energy = 40.8824298 detHess 6.306

0.5536691048 × 4.9627029958 × 8.4029022015  
12.6961896381 × 17.1189317659 × 20.5544191949  
24.9809331039 × 29.2562213042 × 32.6999622765  
37.1028684133 × 40.9442364840 × 44.6822574254  
49.0644656712 × 52.5142668717 × 56.7429042936  
61.1645591928 × 64.5908663688 × 68.9995129599  
73.2928909298 × 76.7257640156 × 81.1291959698



```

85.0080553197 × 88.7029153794 × 93.0708225705
96.5152871681 × 100.7267084946 × 105.1326257895
108.5446671464 × 112.9439802057 × 117.1905382308
120.6227449849 × 125.0014554510 × 128.7652718792
132.5691027621 × 136.9557652071 × 140.3860537317
144.6499452311 × 149.0500809122 × 152.4655524112
156.8761306816 × 161.0844952280 × 164.5325737333
168.9008883143 × 172.5903002478
node 371 energy = 40.8805777 detHess - 271.51864
node371 = {0.5735862088 × 4.9875542625 × 8.4355190670 ×
12.7264616303 × 17.1629744147 × 20.6089009895 ×
25.0382988216 × 29.3601718873 × 32.8087481371 ×
37.2364311559 × 41.2070861123 × 44.8307100474 ×
49.1947324582 × 52.6770568796 × 56.8346478051 ×
61.2612093199 × 64.6923302985 × 69.0829884636 ×
73.4298753336 × 76.8588110786 × 81.2789112869 ×
85.3006000590 × 88.8697357438 × 93.2178552014 ×
96.7088055092 × 100.8349962153 × 105.2513766800 ×
108.6680598348 × 113.0456508979 × 117.3658694601 ×
120.7842070318 × 125.1858755238 × 129.1235166423 ×
132.7537538763 × 137.1003328825 × 140.5471521854 ×
144.7285126876 × 149.1238195487 × 152.5239392217 ×
156.9122921553 × 161.1367523607 × 164.5662401247 ×
168.9428752306 × 172.6830808540};
node 499 energy = 40.00578517 detHess 13.1842
node499 = {0.5669835993 × 4.9872958718 × 8.4451576674 ×
12.7333052685 × 17.1876132704 × 20.6460722236 ×
25.0791644002 × 29.4587053764 × 32.9119839695 ×
37.3624709113 × 41.4826394138 × 45.0040616049 ×
49.3785139466 × 52.9778061643 × 56.9933045706 ×
61.4389330062 × 64.9003397558 × 69.2404340274 ×
73.7055955840 × 77.1781694562 × 81.6289511962 ×
86.0272991950 × 89.4920594695 × 93.9558810964 ×
98.1319317777 × 101.6318066357 × 106.0232703393 ×
109.7037619907 × 113.6335768350 × 118.0743009332 ×
121.5498237544 × 125.8515270369 × 130.3399540938 ×
133.8290472217 × 138.2700724108 × 142.7511157800 ×
146.2504794497 × 150.7361284233 × 155.1617674790 ×
158.6475092145 × 163.1340804147 × 167.3962124247 ×
170.8832211307 × 175.3213272772};
node536 energy = 40.0032105 detHess - 91.825462408093571
? BBP point crossed ?
node536 = {0.5699385794 × 4.9927411025 × 8.4545855578 ×
12.7414244765 × 17.2024245721 × 20.6663367709 ×
25.1001470225 × 29.5013688388 × 32.9610970240 ×
37.4204968854 × 41.6048724653 × 45.0973114988 ×
49.4876676360 × 53.1762995048 × 57.0936640104 ×
61.5294433965 × 65.0010228097 × 69.2988551869 ×
73.7794709669 × 77.2612364342 × 81.7006096333 ×

```

```

86.1591822927 × 89.6451511966 × 94.1251024542 ×
98.4826840357 × 101.9521119205 × 106.4103632272 ×
110.4757109612 × 114.0442062911 × 118.4242929891 ×
121.9873575338 × 126.0600533871 × 130.5188010509 ×
133.9877151131 × 138.3481863522 × 142.8264957654 ×
146.3115283525 × 150.7708101432 × 155.2044820650 ×
158.6841562622 × 163.1633368780 × 167.4445648028 ×
170.9184213696 × 175.3486529896};
node600 energy = 40.002619178 detHess 1470.828
node600 = {0.5775519164 × 5.0067486681 × 8.4789573094 ×
12.7621433022 × 17.2398538155 × 20.7183210633 ×
25.1527230852 × 29.6071056340 × 33.0896825398 ×
37.5669637786 × 41.9124812367 × 45.3799465196 ×
49.8324592804 × 53.8653551835 × 57.4558447809 ×
61.8341023801 × 65.3721064286 × 69.4758578131 ×
73.9326502184 × 77.3949734428 × 81.7679418672 ×
86.2273352138 × 89.7005515219 × 94.1601597453 ×
98.5322601765 × 101.9945249248 × 106.4510453671 ×
110.5523875459 × 114.0918598513 × 118.4698322972 ×
122.0578793688 × 126.0936654833 × 130.5462873670 ×
134.0133618445 × 138.3600898259 × 142.8364771570 ×
146.3185013735 × 150.7732068867 × 155.2047745655 ×
158.6823898133 × 163.1598020683 × 167.4364422884 ×
170.9113868540 × 175.3423502752};
node621 energy = 40.00746868 detHess 609.892
node621 = {0.5782919413 × 5.0081085377 × 8.4813324433 ×
12.7641417768 × 17.2434355402 × 20.7233531331 ×
25.1577160928 × 29.6170513205 × 33.1022839799 ×
37.5808468809 × 41.9414203146 × 45.4104619243 ×
49.8693488869 × 53.9423816264 × 57.5053096649 ×
61.8854987191 × 65.4543982806 × 69.5193511089 ×
73.9776909332 × 77.4472991018 × 81.8046955603 ×
86.2850665057 × 89.7713428956 × 94.2299114570 ×
98.6706128184 × 102.1529433702 × 106.6339644028 ×
110.9357730253 × 114.4070674454 × 118.8444775880 ×
122.7711493041 × 126.4513511555 × 130.8402462844 ×
134.3349383313 × 138.5138579568 × 142.9727621390 ×
146.4321189113 × 150.8315023609 × 155.2659085879 ×
158.7296331677 × 163.1901461392 × 167.4786319021 ×
170.9395699438 × 175.3617538044}
node777 SP energy = 41.8960078 detHess - 4496.65873
node777 = {0.5794317937 × 5.0102025442 × 8.4849929535 ×
12.7672146444 × 17.2489328010 × 20.7310957433 ×
25.1653651828 × 29.6322527896 × 33.1217133562 ×
37.6020765335 × 41.9855566080 × 45.4583876750 ×
49.9267374988 × 54.0627836887 × 57.5891088514 ×
61.9780614454 × 65.6132366296 × 69.6008817340 ×
74.0554811277 × 77.5359722725 × 81.8600051394 ×
86.3616862310 × 89.8638828601 × 94.3126093388 ×

```

98.8261201460 × 102.3486020002 × 106.8407730484 ×  
 111.3595638392 × 114.8922627602 × 119.3999495073 ×  
 123.9270642178 × 127.4679004435 × 131.9816240774 ×  
 136.5300765932 × 140.0868678123 × 144.6030487665 ×  
 149.2089128698 × 152.8149421929 × 157.3224848880 ×  
 162.0706178688 × 165.8575152054 × 170.2476972437 ×  
 175.2046832754 × 179.5004471627};

at all stat points is x1 in its well no movement  
 this NT is after SP1 useless

IRC from 1. SP\_1 : looks like node621

IRCfin = {0.54205064629185362, 4.9410496799373460,  
 8.3665848298648751, 12.663071084199762, 17.057748803362259,  
 20.475779971661307, 24.894317547629850, 29.074418534274368,  
 32.539882978945897, 36.904948730014866, 40.561292406483467,  
 44.492337478423600, 48.918119435697363, 52.364439155686760,  
 56.680607283547872, 61.119764977340907, 64.576656214590756,  
 69.011856133460682, 73.356886139924299, 76.804534100519547,  
 81.250388343505293, 85.267432904599801, 88.867369144313784,  
 93.241006173472968, 96.786797036550894, 100.89053329270774,  
 105.37115604620932, 108.84173667738371, 113.23032484154588,  
 117.71896703142541, 121.23636643032815, 125.68966347576627,  
 130.20738256832036, 133.71403361766832, 138.22638232764953,  
 142.69872898261150, 146.22323402479125, 150.71741000132732,  
 155.16054779118602, 158.64816606719486, 163.14914334538244,  
 167.42298559107257, 170.90873604843995, 175.34324683610549};

N = 44 GOLD min by IRC min energ = 40.02384249870

Setxx = IRCfin;

SetX = {0.5452466866134523, 4.9471747600055815,  
 8.376681383183415, 12.672904251847019, 17.075679283231054,  
 20.49942111992542, 24.920568167088668, 29.131730886584315,  
 32.58801005195747, 36.96694322133806, 40.678743324902804,  
 44.55441161753527, 48.97278828380671, 52.430658010301066,  
 56.71816319350119, 61.17492254324373, 64.63594913865929,  
 69.07038719549196, 73.46051793584661, 76.91769224090126,  
 81.37401496423234, 85.5282324078149, 89.03516446826434,  
 93.42024467234752, 97.06980646917663, 101.03484831066739,  
 105.48336573165719, 108.96107897842315, 113.27791061618231,  
 117.774596001190, 121.27212678708214, 125.71882844458092,  
 130.22071683858042, 133.734738539882, 138.22536403609803,  
 142.71130995183668, 146.2238859260602, 150.7267260076612,  
 155.15991361647608, 158.6533727530405, 163.14683679895543,  
 167.4260002455948, 170.90860658452937, 175.34409991745807}

## Eigenvalues

```
Out[ ]= {4.29699, 4.28124, 4.24958, 4.22863, 4.18147, 4.13204, 4.07264, 4.011,
  3.94197, 3.86841, 3.79466, 3.7296, 3.62255, 3.56727, 3.28978, 3.23671,
  2.6867, 2.61436, 2.50288, 2.42228, 2.30438, 2.18558, 2.06649, 1.94967,
  1.86617, 1.74046, 1.66009, 1.44502, 1.37891, 0.796285, 0.771675,
  0.699088, 0.616027, 0.512379, 0.436906, 0.361907, 0.308055, 0.255789,
  0.195228, 0.162405, 0.139768, 0.117772, 0.00713514, 0.0000458554}
```

extrem flat iMin everywhere ? but x1 is still in the initial well  
 direction mirror EV for second part of the way ? start iMin node621 oben  
 N = 44 push only and pull only

start

```
0.4757768260 × 4.8001435983 × 8.1283583368
12.4191673403 × 16.5633041140 × 19.9526463459
24.2345934843 × 27.7343664366 × 31.7482474582
36.0883663243 × 39.4292830532 × 43.7575264651
47.8628870554 × 51.2947005712 × 55.5834102844
59.0499244949 × 63.1139035558 × 67.4562083117
70.8023855354 × 75.1417783964 × 79.2275275590
82.6785064181 × 86.9693844514 × 90.4213892737
94.5059104148 × 98.8457052906 × 102.1920439403
106.5343098750 × 110.6003736000 × 114.0655340155
118.3545604117 × 121.7883744572 × 125.8918397020
130.2214647830 × 133.5630213327 × 137.9035504932
141.9233248743 × 145.4190014208 × 149.7015595966
153.0952409332 × 157.2354307610 × 161.5307891526
164.8600751536 × 169.1866583691
SP node160 energy = 40.79531722 detHess - 27.032
3.4747343197 × 7.0349872431 × 11.2781962757
14.5610777739 × 18.7554465509 × 22.8558448101
26.1953448750 × 30.4084703140 × 33.7761195823
37.8480425804 × 42.0683463697 × 45.3469521519
49.6043859446 × 53.2478370174 × 57.0498540759
61.3323374216 × 64.6173601592 × 68.8794209586
72.9080383667 × 76.3303496129 × 80.5555499387
83.8781125993 × 88.0111071991 × 92.1905979278
95.4860604194 × 99.7267471270 × 103.2471455722
107.1802401086 × 111.4713018163 × 114.7638887206
119.0518944384 × 123.0171569188 × 126.5073495324
130.7446121448 × 134.0490121690 × 138.2155489831
142.3675585334 × 145.6803253197 × 149.9126929587
153.3719350275 × 157.3675258543 × 161.6470494208
164.9370630705 × 169.2270707733
iMin node344 energy = 39.96533763 detHess 3933.53
6.5211368453 × 10.6236644803 × 13.7945570853
17.9073307928 × 21.2112360458 × 25.2183585313
29.3109937573 × 32.5429204025 × 36.6779725563
39.9603209773 × 44.0136525803 × 48.0983344757
```

51.3556262430 × 55.4996114142 × 58.7766432787  
 62.8453937173 × 66.9276843875 × 70.1941013092  
 74.3420339832 × 77.6194802507 × 81.6927317028  
 85.7773056225 × 89.0459680293 × 93.1972348878  
 96.4808076126 × 100.5530023234 × 104.6472326589  
 107.9139434789 × 112.0717678619 × 115.3745835177  
 119.4380691972 × 123.5590714779 × 126.8192134474  
 130.9943551680 × 134.3546086889 × 138.3846146902  
 142.5685442459 × 145.8215716933 × 150.0403468497  
 153.5730322734 × 157.4626742333 × 161.7260595261  
 164.9916195317 × 169.2554977062  
 next iSP node435 energy = 40.0553388 detHess - 9.109  
 6.6727291744 × 10.9211165558 × 14.1722746337  
 18.4228164999 × 22.2594535285 × 25.8309931394  
 30.0454124414 × 33.2798212755 × 37.4715833889  
 41.4377751336 × 44.8417445318 × 49.0031958282  
 52.2118599829 × 56.3508187252 × 60.2932166793  
 63.6685347233 × 67.7862769173 × 70.9331668398  
 75.0496257758 × 78.8245043257 × 82.3185248659  
 86.4074250205 × 89.4964180218 × 93.5846516873  
 97.0573004714 × 100.8559515880 × 104.9738988611  
 108.1279300215 × 112.2491138507 × 115.6201921243  
 119.5712763999 × 123.7119614829 × 126.9243341044  
 131.0889889207 × 134.4971713081 × 138.4628050945  
 142.6590720423 × 145.8952269513 × 150.1136061178  
 153.7009855192 × 157.5232054506 × 161.7745945922  
 165.0261355813 × 169.2733995302  
 next flat iMin node452 energy = 40.056684 detHess 1.33634  
 6.6072693382 × 10.8083802493 × 14.0269608611  
 18.2394749266 × 21.8790551464 × 25.6304942013  
 29.8593856340 × 33.0883786736 × 37.3122092092  
 41.1587179309 × 44.6925464300 × 48.8783977241  
 52.0810765856 × 56.2539417968 × 60.1363293634  
 63.5872944544 × 67.7238695938 × 70.8765344276  
 75.0110711074 × 78.7680545155 × 82.2987761820  
 86.4083882094 × 89.5181066725 × 93.6276757716  
 97.1561252035 × 100.9157125025 × 105.0506249910  
 108.2040522781 × 112.3411627636 × 115.7921309601  
 119.6751785332 × 123.8486384230 × 127.0517845173  
 131.2382840771 × 134.7740066122 × 138.6190487778  
 142.8433283695 × 146.0725180468 × 150.3016411350  
 154.0559030861 × 157.6925746738 × 161.9045226389  
 165.1227921675 × 169.3232208689  
 next SP node555 energy = 39.987942956 detHess - 215.523  
 6.5081177195 × 10.6169691689 × 13.7966394962  
 17.9188884619 × 21.2391186351 × 25.2424714475  
 29.3553344061 × 32.5857684241 × 36.7368913407  
 40.0675512072 × 44.0966066278 × 48.2397227480  
 51.4845617487 × 55.6681833101 × 59.0807574123

63.0657915436 × 67.2826361781 × 70.5335049194  
 74.7727938965 × 78.4266371111 × 82.1934180802  
 86.4501287292 × 89.7084255357 × 93.9517891180  
 97.9034652903 × 101.3633961463 × 105.5628969700  
 108.8130187413 × 112.9729082194 × 117.0086912065  
 120.3485091023 × 124.5120738106 × 127.7622090075  
 131.8763084266 × 135.9198834141 × 139.2245833930  
 143.3677735973 × 146.6000520486 × 150.7021333820  
 154.7100404855 × 158.0203775929 × 162.1387119177  
 165.3165437734 × 169.4219496849

node625 energy = 39.9658696768 detHess 5332.91180

6.6655271528 × 10.9290938341 × 14.1948695270  
 18.4589808875 × 22.3423720416 × 25.8817163542  
 30.1019491796 × 33.3549791369 × 37.5409655802  
 41.5694641494 × 44.9320178714 × 49.1078246147  
 52.3677660790 × 56.4897617827 × 60.5528855650  
 63.8564566535 × 68.0145360842 × 71.2811804281  
 75.3757794411 × 79.4479360932 × 82.7317443939  
 86.8831427570 × 90.1519000890 × 94.2365590409  
 98.3099976614 × 101.5874559375 × 105.7355488879  
 109.0023441246 × 113.0845271603 × 117.1539021771  
 120.4307304654 × 124.5750862656 × 127.8334542817  
 131.9177493111 × 135.9729063255 × 139.2545143833  
 143.3905445672 × 146.6252936679 × 150.7171156958  
 154.7296892336 × 158.0307496785 × 162.1458748599  
 165.3229555525 × 169.425195557

SP node186 energy = 40.794916 detHess - 64.3291

6.7022494150 × 10.9923773223 × 14.2825103399  
 18.5620995865 × 22.5581749818 × 26.0171241816  
 30.2495974518 × 33.5627585388 × 37.7145482416  
 41.8817737299 × 45.1860542166 × 49.4237286099  
 52.9155904011 × 56.8793875697 × 61.1679086486  
 64.4607648756 × 68.7519328735 × 72.6879219088  
 76.2058671270 × 80.4464726662 × 83.7429509863  
 87.9214109900 × 92.0567011032 × 95.3782767473  
 99.6044765786 × 103.0311607992 × 107.0561602210  
 111.3208141759 × 114.6065549953 × 118.8904005588  
 122.7035141125 × 126.3362202753 × 130.5918810913  
 133.8707334990 × 138.0879098929 × 142.1633978370  
 145.5273170262 × 149.7402177666 × 153.0826124614  
 157.1798585791 × 161.3771628819 × 164.6592939341  
 168.9040345105 × 172.4730345984

gMin node343 energy = 39.61964273 detHess 1069.6239

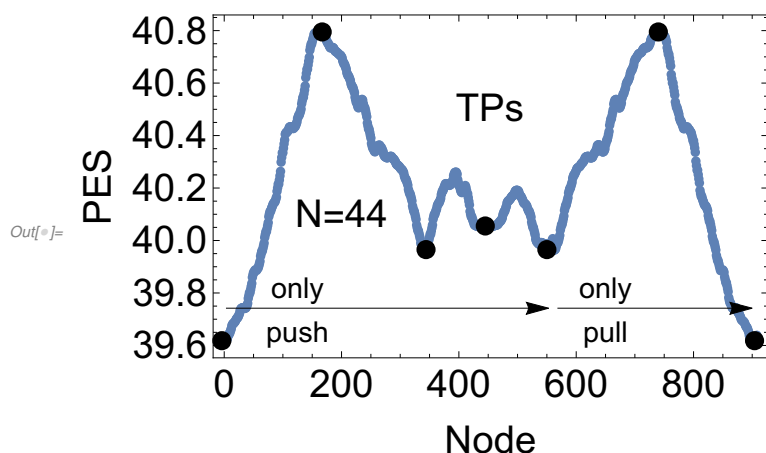
6.7425440499 × 11.0691396510 × 14.3984399632  
 18.6938022014 × 22.8340397002 × 26.2277074752  
 30.5102880379 × 34.0060492149 × 38.0257502451  
 42.3663122647 × 45.7078951135 × 50.0375200970  
 54.1411520101 × 57.5748818378 × 61.8639554490  
 65.3293336417 × 69.3952005024 × 73.7375788175

```

77.0839907982 × 81.4238009151 × 85.5088427426
88.9605604219 × 93.2515627318 × 96.7031441041
100.7883491189 × 105.1281059300 × 108.4744964405
112.8168800382 × 116.8824702638 × 120.3480277122
124.6370589498 × 128.0705221015 × 132.1744067380
136.5038489156 × 139.8453462717 × 144.1858548587
148.2047743963 × 151.7010751835 × 155.9835711754
159.3766532013 × 163.5174222813 × 167.8121804872
171.1413311886 × 175.4676354994
SP ? node611 energy = 40.8785396 detHess - 749.643839
6.8194447943 × 11.2135911119 × 14.6314091118
18.9295555617 × 23.3076163470 × 26.7178446858
31.1279706793 × 35.2541038318 × 38.7386352589
43.0853295587 × 46.6505855228 × 50.6716712868
55.0878681883 × 58.5101086352 × 62.8570129017
67.2290743438 × 70.6503913792 × 75.0710803657
79.1704301820 × 82.6801393500 × 87.0306328336
90.5771443728 × 94.6283629541 × 99.0510436748
102.4778506953 × 106.8347657487 × 111.2122948685
114.6387937631 × 119.0648623267 × 123.1804883775
126.6842822117 × 131.0404854209 × 134.6093957684
138.6392764583 × 143.0670323771 × 146.5025366926
150.8517493798 × 155.2562358904 × 158.6924566194
163.1277943181 × 167.3302660135 × 170.7976097759
175.1783725282 × 178.8768996362
node662 energy = 40.88428260 detHess 5.5504338
6.8360892022 × 11.2444720511 × 14.6836703693
18.9772156077 × 23.3980740700 × 26.8323293372
31.2583024008 × 35.5273032239 × 38.9715404381
43.3715952368 × 47.1982073946 × 50.9505703534
55.3356743896 × 58.7841098979 × 63.0196807004
67.4419766761 × 70.8694971997 × 75.2801991242
79.5731503057 × 83.0070908772 × 87.4111410086
91.2895630173 × 94.9856349607 × 99.3544095119
102.7998956659 × 107.0114245125 × 111.4189505783
114.8322587194 × 119.2321282546 × 123.4841492184
126.9158127811 × 131.2971231269 × 135.0734315169
138.8647919259 × 143.2491005149 × 146.6800543380
150.9385980128 × 155.3388140766 × 158.7534491424
163.1627823256 × 167.3734112279 × 170.8203560224
175.1897409113 × 178.8852458550

xxxx = Join[NT44eps5m9push, NT44eps5m9pull];

```



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

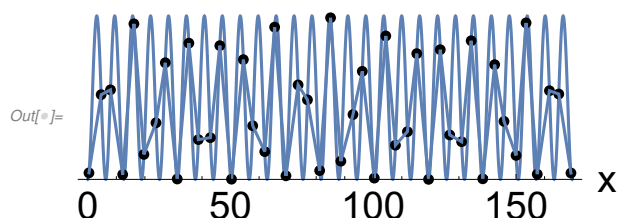
```
N = 45 GOLD a0 - min ### ### ###
```

```
ENERGY 40.67788925638868
```

```
SetX = {0.40140529672023995, 4.6753399646077884, 7.949960729002154,
12.21997927044098, 16.150492143766932, 19.652779048900083,
23.87466383547461, 27.145048246540554, 31.31953982045212,
35.3977937606324, 38.73122114646023, 42.923032034370316,
46.24284701245552, 50.334065114567004, 54.49381212720898,
57.768445939948755, 61.982102763501175, 65.4446437249435,
69.41168403487973, 73.67103828842248, 76.94259630637323,
81.21380533013986, 85.03426563345631, 88.64502977034775,
92.88492536952003, 96.14636283142241, 100.3545573591999,
104.38725838154015, 107.76456766367876, 111.95553526763982,
115.2371188297493, 119.36114956289272, 123.46581040081276,
126.76073822509707, 130.94552351562731, 134.28809936244912,
138.3482992131454, 142.5264463232031, 145.78988881406738,
150.010374579609, 153.52327658850865, 157.43915203977363,
161.70685185675595, 164.97817628438568, 169.24850839794527`}
```

```
Eigenvalues
```

```
Out[*]= {4.26433, 4.24996, 4.22757, 4.19572, 4.15441, 4.10752, 4.04686, 4.0021,
3.92061, 3.82785, 3.75415, 3.66831, 3.58183, 3.4995, 3.41275, 3.36796,
3.05507, 3.05058, 2.46841, 2.4057, 2.32772, 2.23486, 2.1342, 2.0403,
1.95753, 1.89054, 1.64493, 1.6403, 0.932109, 0.894727, 0.817744, 0.744724,
0.660373, 0.598037, 0.494063, 0.485994, 0.324685, 0.304834, 0.185083,
0.153577, 0.0989625, 0.0697745, 0.0371857, 0.0323733, 0.00275771}
```



```
SP node232 energy = 41.6584022 detHess - 478.67
```

```
0.4598480497 × 4.7859974381 × 8.1148547061
```



```

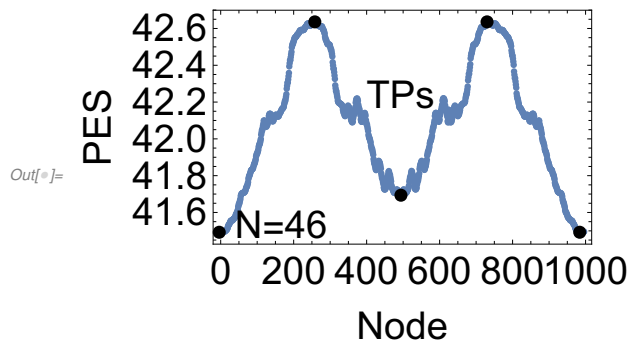
12.4098771341 × 16.5490440598 × 19.9428469122
24.2247939099 × 27.7184986547 × 31.7398563762
36.0795085631 × 39.4203515730 × 43.7498993023
47.8491354618 × 51.2850523238 × 55.5728520116
59.0324923121 × 63.1034847601 × 67.4427808629
70.7872197380 × 75.1265235515 × 79.1974577744
82.6571400972 × 86.9449343591 × 90.3807986234
94.4800889456 × 98.8096047062 × 102.1504338116
106.4900786412 × 110.5112946395 × 114.0050984735
118.2870310894 × 121.6807282360 × 125.8199923934
130.1149073516 × 133.4437383665 × 137.7698363695
141.6517708777 × 145.2572522242 × 149.5399627136
152.8716637928 × 157.0788197623 × 161.2851628146
164.6172322272 × 168.8996689176 × 172.5031535176
node 453 detHess 313.985 energy = 40.6126104
0.4945802786 × 4.8821261237 × 8.2840425429
12.5948994378 × 16.9342812866 × 20.3324113467
24.7266771340 × 28.7259463470 × 32.2887985243
36.6178284953 × 40.0642964309 × 44.2114858142
48.5858626873 × 51.9661549127 × 56.3380251509
60.5008070245 × 63.9389248097 × 68.2714354541
71.8569028874 × 75.8315384372 × 80.2260555437
83.6272286424 × 87.9589009341 × 92.2848798900
95.6867514245 × 100.0799467579 × 104.0372599516
107.6379017747 × 111.9722437261 × 115.4042784513
119.5773746030 × 123.9460555923 × 127.3255002845
131.7008075359 × 135.8325070588 × 139.2869533091
143.6122238230 × 147.1535224633 × 151.1754153972
155.5672702508 × 158.9608318394 × 163.3066041151
167.5961921158 × 170.9983304062 × 175.3766994158
node 680 ..
node 914 energy = 40.679402 detHess - 68.538831
6.6840463633 × 10.9560123585 × 14.2287608247
18.4973175030 × 22.4208745252 × 25.9278098626
30.1486568665 × 33.4152155186 × 37.5913672552
41.6599827490 × 44.9979449949 × 49.1857294302
52.4916724907 × 56.5904235879 × 60.7309183756
64.0086760514 × 68.2098248695 × 71.6244166688
75.6299410470 × 79.8651147483 × 83.1302720181
87.3880046286 × 91.1005690958 × 94.8187513917
99.0773836274 × 102.3428776839 × 106.5794437288
110.5834522376 × 114.0001684311 × 118.2019693486
121.4797169977 × 125.6210795494 × 129.7198284148
133.0263016156 × 137.2144544640 × 140.5527985903
144.6215177308 × 148.7982812142 × 152.0649856526
156.2863568469 × 159.7950729048 × 163.7171593775
167.9862185976 × 171.2592346703 × 175.5313505116
o.k. moved

```



36.6250872591 × 40.0719293689 × 44.2140268464  
 48.5857856526 × 51.9634682581 × 56.3330731807  
 60.4887498184 × 63.9281236282 × 68.2570069432  
 71.8293335278 × 75.8160729200 × 80.2086079828  
 83.6059407453 × 87.9413588009 × 92.2535434475  
 95.6540471811 × 100.0410465639 × 103.9574921017  
 107.5928430147 × 111.9305434350 × 115.3487495628  
 119.5441398513 × 123.9024200855 × 127.2787886925  
 131.6541768250 × 135.7410125158 × 139.2206509100  
 143.5366301764 × 147.0239928934 × 151.1011965280  
 155.4784540612 × 158.8561731008 × 163.2128013807  
 167.4199751086 × 170.8342421684 × 175.1762222165  
 178.8343960362  
 iMin node494 energy = 41.69373 detHess 1001.864  
 0.5700533230 × 4.9839127017 × 8.4344087271  
 12.7211332689 × 17.1620034055 × 20.6096818065  
 25.0394908409 × 29.3761845738 × 32.8208330069  
 37.2517532439 × 41.2500879032 × 44.8503788009  
 49.2137602275 × 52.7088627836 × 56.8468147108  
 61.2785160485 × 64.7103697959 × 69.0952500506  
 73.4603432685 × 76.8920586681 × 81.3208140048  
 85.3967383228 × 88.9298884556 × 93.2852549663  
 96.8199845885 × 100.8938306395 × 105.3226314961  
 108.7545731761 × 113.1189771542 × 117.5050210678  
 120.9371290165 × 125.3691363150 × 129.5108153793  
 133.0040672656 × 137.3682904919 × 140.9735069380  
 144.9664485960 × 149.3972228774 × 152.8426795355  
 157.1772295061 × 161.6092214397 × 165.0578748594  
 169.4988178663 × 173.7931062969 × 177.2429592783  
 181.6599626097  
 SP node730 energy = 42.636116 detHess - 271.467  
 3.3638664596 × 7.0288006417 × 11.3721588309  
 14.7855909408 × 18.9960596342 × 23.3525085259  
 26.7308091653 × 31.1087379573 × 35.1842867260  
 38.6733057296 × 42.9895739872 × 46.4683251960  
 50.5566833121 × 54.9321441584 × 58.3086503147  
 62.6673140698 × 66.8621802483 × 70.2807718077  
 74.6184409796 × 78.2529852255 × 82.1704437007  
 86.5576761356 × 89.9583065712 × 94.2708330604  
 98.6064109605 × 102.0039112588 × 106.3966280660  
 110.3838481614 × 113.9559204320 × 118.2849112446  
 121.7246947521 × 125.8800335801 × 130.2500165221  
 133.6279368484 × 137.9997858993 × 142.1433742370  
 145.5896044359 × 149.9160626016 × 153.4715367884  
 157.4767768956 × 161.8688034095 × 165.2637761940  
 169.6047388535 × 173.9044487821 × 177.3054338885  
 181.6875535592  
 gMin node984 energy = 41.49244 detHess 71.235292  
 6.7300017404 × 11.0413432392 × 14.3537319537

18.6427619746  $\times$  22.7264687808  $\times$  26.1393509273  
 30.3972568869  $\times$  33.8037518388  $\times$  37.8946372355  
 42.1798045755  $\times$  45.4916936275  $\times$  49.8016983008  
 53.6643672508  $\times$  57.2725734372  $\times$  61.5430955660  
 64.8531276933  $\times$  69.0633987782  $\times$  73.2220532100  
 76.5584184038  $\times$  80.8116644473  $\times$  84.3007463023  
 88.2886642611  $\times$  92.5950095152  $\times$  95.9047127374  
 100.2107084784  $\times$  104.2018942505  $\times$  107.6881191080  
 111.9412261190  $\times$  115.2790906223  $\times$  119.4360535208  
 123.6485205653  $\times$  126.9581142113  $\times$  131.2297551502  
 134.8441670635  $\times$  138.7004726809  $\times$  143.0100175406  
 146.3218431557  $\times$  150.6055309294  $\times$  154.6994599368  
 158.1034389914  $\times$  162.3615119844  $\times$  165.7774090745  
 169.8579384487  $\times$  174.1488199724  $\times$  177.4615815130  
 181.7736057331



```
### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###
```

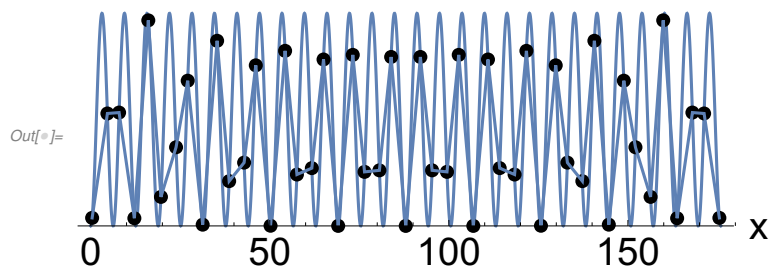
N = 47 GOLD a0 - min

ENERGY 42.63875863889012

```
SetX = {0.3906657360443698, 4.654691856715236,
  7.920381925009873, 12.183868241410513, 16.074111313633846,
  19.60633277370629, 23.82513568733756, 27.078374146985084,
  31.262180070264375, 35.29284437247991, 38.65268040136013,
  42.828002473940714, 46.088814748575274, 50.209527791138946,
  54.27431515107906, 57.57655656321755, 61.73500825951606,
  65.00368824898379, 69.09711705426982, 73.1726256294486,
  76.45496561447386, 80.60806380707096, 83.88236023873128,
  87.96459300514732, 92.04682465580457, 95.32112221292647,
  99.47422030147237, 102.75655923287539, 106.8320691252631,
  110.92549681650453, 114.19417797096298, 118.35262987955747,
  121.65487032094491, 125.71965919938827, 129.8403720206165,
  133.1011850494212, 137.276507246369, 140.63634297345297,
  144.66700791447067, 148.8508136897202, 152.10405237374678,
  156.32285576606134, 159.85507729993395, 163.7453204527816,
  168.0088068184421, 171.27449687111834, 175.53852293824087`}
```

Eigenvalues

```
Out[ ] = {4.26187, 4.24987, 4.22894, 4.19956, 4.16201, 4.11668, 4.06463, 4.00954, 3.96127,
  3.85558, 3.7866, 3.70728, 3.6241, 3.53962, 3.45684, 3.38027, 3.31744,
  3.04289, 3.04284, 2.43673, 2.39204, 2.31786, 2.23008, 2.138, 2.04908,
  1.97217, 1.92231, 1.65285, 1.6528, 0.976558, 0.921629, 0.853694, 0.778074,
  0.698174, 0.61618, 0.534625, 0.479892, 0.464951, 0.328617, 0.265128,
  0.202054, 0.150305, 0.108337, 0.0752665, 0.0509931, 0.0271281, 0.0261036}
```



```
SP node 295 energy = 43.535246 detHess - 54.56120
0.4325600207 × 4.7423076849 × 8.0525028801
12.3430573645 × 16.4121500376 × 19.8338284609
24.0883765682 × 27.4783191901 × 31.5828356228
35.8534872444 × 39.1616670504 × 43.4639945036
47.2709155298 × 50.9313399563 × 55.2094980690
58.5143619099 × 62.7422616306 × 66.8806897149
70.2313085455 × 74.4803965380 × 77.9352011451
81.9584512832 × 86.2552133416 × 89.5615628910
93.8675699661 × 97.8024618934 × 101.3359128337
105.5901583181 × 108.9039401313 × 113.0860407535
117.2568468402 × 120.5766360537 × 124.8270496426
128.3350559308 × 132.2961650230 × 136.5994894458
139.9046008171 × 144.2043372891 × 148.2000392725
```

151.6771653573 × 155.9254875873 × 159.2593605052  
 163.4134930824 × 167.6182790696 × 170.9256529356  
 175.1909421502 × 178.7832394300

node697 energy = 43.5439769 detHess - 253.0350  
 ? same point like node 295?

0.4363022096 × 4.7458282328 × 8.0559132952  
 12.3456793458 × 16.4165412181 × 19.8366484065  
 24.0911827179 × 27.4825249001 × 31.5854924354  
 35.8572144610 × 39.1654598602 × 43.4682554922  
 47.2793505390 × 50.9356102908 × 55.2129562236  
 58.5178075597 × 62.7443637102 × 66.8835420693  
 70.2331575611 × 74.4820524646 × 77.9376711248  
 81.9597014806 × 86.2564460686 × 89.5626086089  
 93.8684007633 × 97.8038493647 × 101.3365866012  
 105.5905852397 × 108.9042654005 × 113.0861029892  
 117.2567082741 × 120.5763694599 × 124.8265574214  
 128.3340084090 × 132.2954957743 × 136.5985695531  
 139.9034856709 × 144.2031417356 × 148.1976245720  
 151.6755976641 × 155.9237679647 × 159.2567943733  
 163.4115455447 × 167.6150049936 × 170.9225016280  
 175.1870042713 × 178.7756075533

node803 energy = 43.5519 detHess - 884.50790  
 0.4415906326 × 4.7507573848 × 8.0606601138  
 12.3492807650 × 16.4225127218 × 19.8404675328  
 24.0949481668 × 27.4881438696 × 31.5890060539  
 35.8620849062 × 39.1703942965 × 43.4737562662  
 47.2902149436 × 50.9411142925 × 55.2174041113  
 58.5222449766 × 62.7470603481 × 66.8871845667  
 70.2355158712 × 74.4841555502 × 77.9408012282  
 81.9612762424 × 86.2579793218 × 89.5638915845  
 93.8693977225 × 97.8054865621 × 101.3373660069  
 105.5910464996 × 108.9045655798 × 113.0860930726  
 117.2563783458 × 120.5758928634 × 124.8257595099  
 128.3323551510 × 132.2944595731 × 136.5971763515  
 139.9018209684 × 144.2013746732 × 148.1940728593  
 151.6733058184 × 155.9212722117 × 159.2530914582  
 163.4087400627 × 167.6102946045 × 170.9179882856  
 175.1813690552 × 178.764708098

START energy 42.638761592719774  
 0.3967602631 × 4.6607842631 × 7.9264742631  
 12.1899942631 × 16.0801942631 × 19.6123942631  
 23.8311942631 × 27.0844942631 × 31.2682942631  
 35.2988942631 × 38.6587942631 × 42.8340942631  
 46.0948942631 × 50.2155942631 × 54.2803942631  
 57.5826942631 × 61.7410942631 × 65.0097942631  
 69.1031942631 × 73.1786942631 × 76.4610942631  
 80.6141942631 × 83.8884942631 × 87.9706942631

92.0528942631 × 95.3271942631 × 99.4802942631  
 102.7630942631 × 106.8380942631 × 110.9310942631  
 114.2000942631 × 118.3590942631 × 121.6610942631  
 125.7260942631 × 129.8460942631 × 133.1070942631  
 137.2830942631 × 140.6420942631 × 144.6730942631  
 148.8570942631 × 152.1100942631 × 156.3290942631  
 159.8610942631 × 163.7510942631 × 168.0150942631  
 171.2800942631 × 175.5450942631  
 SP node 294 energy = 43.5359975 detHess - 75.84  
 0.4444985511 × 4.7534477586 × 8.0632397593  
 12.3512170567 × 16.4256969062 × 19.8424976394  
 24.0969348223 × 27.4910982369 × 31.5908376494  
 35.8645976699 × 39.1729301749 × 43.4765639985  
 47.2957488760 × 50.9439194247 × 55.2196668582  
 58.5245046583 × 62.7484288707 × 66.8890256149  
 70.2367062943 × 74.4852128449 × 77.9423713462  
 81.9620617423 × 86.2587350560 × 89.5645155086  
 93.8698718618 × 97.8062515584 × 101.3377222622  
 105.5912405324 × 108.9046635206 × 113.0860462848  
 117.2561400444 × 120.5755883089 × 124.8252769888  
 128.3313719479 × 132.2938507459 × 136.5963694153  
 139.9008663301 × 144.2003680845 × 148.1920564488  
 151.6720109316 × 155.9198700346 × 159.2510208399  
 163.4071729412 × 167.6076654547 × 170.9154789602  
 175.1782378399 × 178.7586626065  
 ? SP2 node 621 energy=44.6626367343 detHess 354.899333  
 -2.9293070054 × 0.7400328942 × 5.0836849965  
 8.4954791955 × 12.7084739163 × 17.0630941649  
 20.4408802033 × 24.8184555506 × 28.8868936804  
 32.3803680958 × 36.6955733143 × 40.1674009447  
 44.2628005645 × 48.6350396069 × 52.0090569759  
 56.3681852878 × 60.5478093654 × 63.9711923136  
 68.3029326307 × 71.9089354700 × 75.8556704826  
 80.2440643533 × 83.6413496925 × 87.9638690528  
 92.2856631653 × 95.6830509165 × 100.0712691999  
 104.0158120522 × 107.6238014042 × 111.9558373771  
 115.3786152537 × 119.5594398228 × 123.9182303125  
 127.2922385129 × 131.6645804510 × 135.7583464815  
 139.2312344026 × 143.5462182227 × 147.0379910458  
 151.1082435869 × 155.4852648668 × 158.8625639413  
 163.2174466537 × 167.4274695101 × 170.8400413464  
 175.1824753591 × 178.8456791736  
 relaxed state ?  
 next SP node 950 energy = 43.544845448 detHess - 187.285594  
 -2.8421206239 × 0.7444050772 × 5.0084651482  
 8.3160365158 × 12.5187462289 × 16.6738495571  
 20.0063996238 × 24.2544878003 × 27.7329511030  
 31.7267359272 × 36.0263500984 × 39.3311582404  
 43.6340911831 × 47.5958121349 × 51.1029337497

$55.3529949001 \times 58.6725936565 \times 62.8430769790$   
 $67.0247839732 \times 70.3384026453 \times 74.5922714729$   
 $78.1246499947 \times 82.0603706664 \times 86.3660473501$   
 $89.6721090577 \times 93.9688393495 \times 97.9902326183$   
 $101.4462735395 \times 105.6950652062 \times 109.0441554500$   
 $113.1837227140 \times 117.4095697554 \times 120.7144160779$   
 $124.9913323303 \times 128.6454037007 \times 132.4586897132$   
 $136.7617216062 \times 140.0699960092 \times 144.3422748815$   
 $148.4443985341 \times 151.8364900716 \times 156.0910074509$   
 $159.5102539644 \times 163.5820705903 \times 167.8713873963$   
 $171.1814036032 \times 175.4907934365$

truely moved (back) ok

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

N = 47 GOLD search i - min ? start SP2

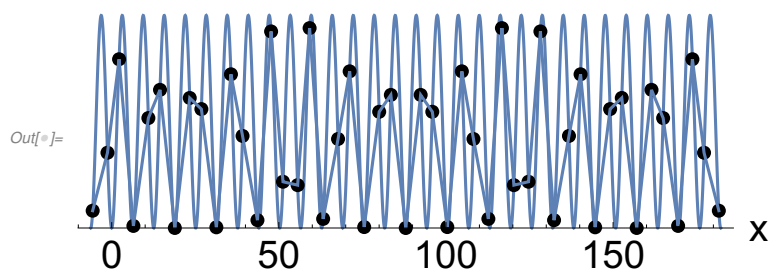
ENERGY 42.84735066107245

SetX = {-5.704693153794564, -1.2747088287229453,  
 2.19879017751016, 6.481497096385352, 10.961218681346878,  
 14.441530651979404, 18.875880020053756, 23.33655106284272,  
 26.822515799844712, 31.30141068735207, 35.666039891922054,  
 39.135629417501534, 43.59621753842978, 47.68024638404192,  
 51.23617935011845, 55.617391933011525, 59.19622273173767,  
 63.249238008074435, 67.70762473112025, 71.17932889835157,  
 75.53171599632793, 80.01719934631917, 83.5070422653368,  
 87.96458956306088, 92.4221325878613, 95.91197474561758,  
 100.39745832877206, 104.74983186009248, 108.22153595963034,  
 112.67991860887795, 116.73290101808553, 120.31175614710243,  
 124.69296965654775, 128.24888156154398, 132.33294116854628,  
 136.7935323650223, 140.26312278998668, 144.6277655159808,  
 149.10666145930605, 152.59262853579622, 157.0533035818975,  
 161.48765268115488, 164.96796568128124, 169.4476889291214,  
 173.73039521695355, 177.2038955058009, 181.6338806570567`}

very strong relaxed state !!! but not glob min !!

Eigenvalues

Out[\*]= {4.29459, 4.28134, 4.27158, 4.23071, 4.19272, 4.15648, 4.10242, 4.04335, 3.98463,  
 3.91737, 3.84618, 3.78116, 3.72454, 3.60787, 3.57751, 3.28072, 3.2807,  
 2.67671, 2.61395, 2.57044, 2.45192, 2.3433, 2.24226, 2.12826, 2.02599,  
 1.91254, 1.79217, 1.75214, 1.67107, 1.39214, 1.3921, 0.796282, 0.759014,  
 0.74874, 0.590714, 0.518761, 0.493392, 0.392147, 0.322268, 0.285666,  
 0.226266, 0.179022, 0.150212, 0.125705, 0.117416, 0.0130071, 0.0102447}





```

this iMin moved by as = 2 pi
iMin = {0.57849 , 5.00847 , 8.48197 , 12.76468 ,
17.24438 , 20.72468 , 25.15908 , 29.61978 ,
33.10568 , 37.58458 , 41.94918 , 45.41878 ,
49.87938 , 53.96338 , 57.51938 , 61.90058 ,
65.47938 , 69.53238 , 73.99078 , 77.46248 ,
81.81488 , 86.30038 , 89.79018 , 94.24778 ,
98.70528 , 102.19518 , 106.68018 , 111.03318 ,
114.50518 , 118.96318 , 123.01618 , 126.59518 ,
130.97618 , 134.53218 , 138.61618 , 143.07718 ,
146.54618 , 150.91118 , 155.39018 , 158.87618 ,
163.33618 , 167.77118 , 171.25118 , 175.73118 ,
180.01318 , 183.48718 , 187.91718 };

```

```
eps 5.555 * 10 ^ -12
```

```
SD von post - SP aus : 42.420770590167663
```

```
N = 47 GOLD i - min search start SP2
```

```
Setxx = IRCfin2pi;
```

```
ENERGY 42.41311868378095
```

```

SetX = {0.5155151052396313, 4.891720258705399,
8.283962218416859, 12.585178021410966, 16.905200122721652,
20.29418794193458, 24.675227596303586, 28.61454842954426,
32.22017991291314, 36.54612434563808, 39.9580885580045,
44.142455758547456, 48.48629774613167, 51.85177413205532,
56.217130467478974, 60.25698980979666, 63.75997351306751,
68.0634520778468, 71.4987192112188, 75.62139270169938,
79.96538734846905, 83.31990867123929, 87.67213899744614,
91.73606518371756, 95.21094501023634, 99.50682771959309,
102.94844443852801, 107.05253251769165, 111.3927515752596,
114.74190685626482, 119.08834199603007, 123.14673773064733,
126.62034096060178, 130.9112011243531, 134.34184670700486,
138.45166682171768, 142.78126802215655, 146.1238334652684,
150.46560798443267, 154.4825454929764, 157.98148786299032,
162.26490899453722, 165.65807318670872, 169.80009553157228,
174.0956010326466, 177.4254378931663, 181.75249741005717` }

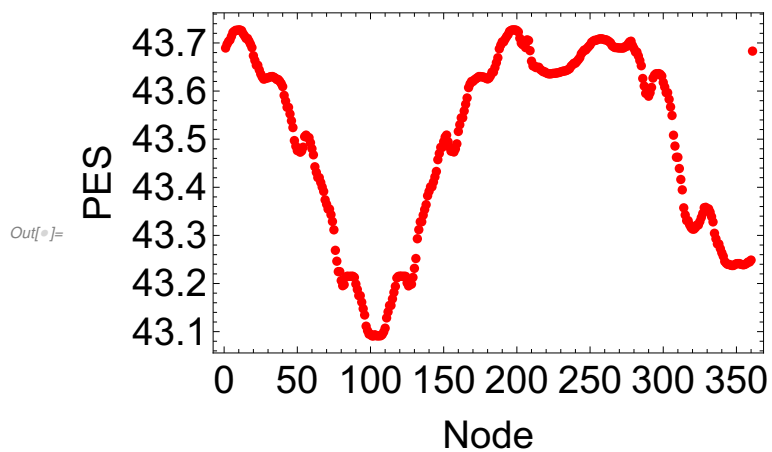
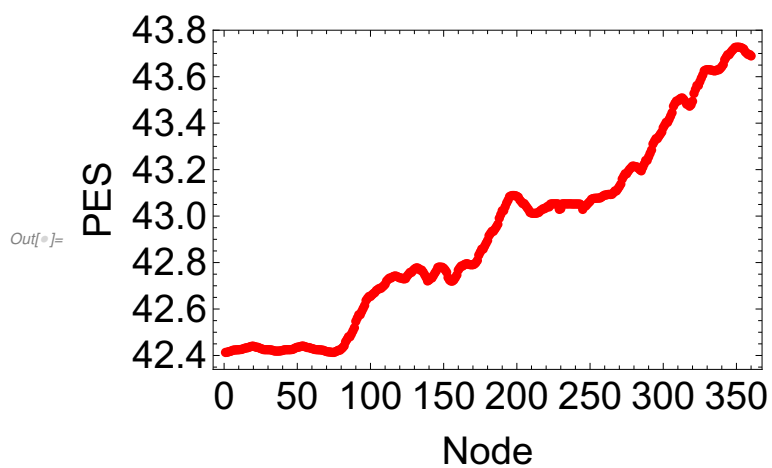
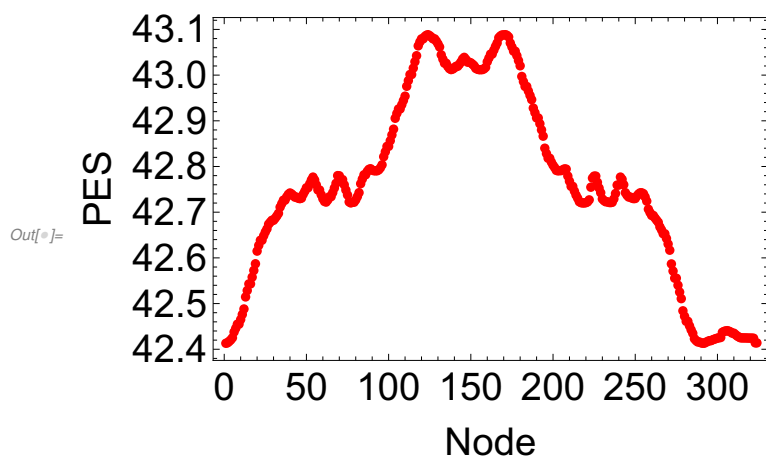
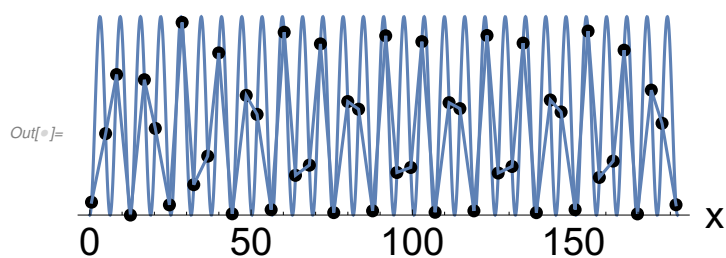
```

```
Eigenvalues
```

```

Out[ ]= {4.27511, 4.26258, 4.24169, 4.21286, 4.17834, 4.1382, 4.08207, 4.02329, 3.95881,
3.88985, 3.82116, 3.72169, 3.65279, 3.5797, 3.51338, 3.46286, 3.19718,
3.12711, 2.55511, 2.5018, 2.42397, 2.33143, 2.23344, 2.13987, 2.03886,
1.94326, 1.86172, 1.80411, 1.56452, 1.48955, 0.856282, 0.815153, 0.759432,
0.697909, 0.63961, 0.578358, 0.410952, 0.358154, 0.301631, 0.251228,
0.216894, 0.19206, 0.0972659, 0.0642862, 0.0396219, 0.0231377, 0.0134481}

```



energy = 43.68969126985 detHess = 0.108834 gradient norm 0.66 at the slope  
node361

$-1.9352559556 \times 1.4807587312 \times 5.8927227817$

9.9240706628 × 13.4766138368 × 17.8188100039  
 21.3033234059 × 25.4226951652 × 29.8279750118  
 33.2334019773 × 37.6085576735 × 41.8932829022  
 45.3093046286 × 49.6957569826 × 53.5428082172  
 57.2545425182 × 61.6149768934 × 65.0373897242  
 69.2650285119 × 73.6420956884 × 77.0362875872  
 81.4282179403 × 85.5696537387 × 89.0319041498  
 93.3700603222 × 96.9389327515 × 100.9431664648  
 105.3480276334 × 108.7583620850 × 113.0997833445  
 117.4436524168 × 120.8537809456 × 125.2591565880  
 129.2709275144 × 132.8337137670 × 137.1715677749  
 140.6377961860 × 144.7737754526 × 149.1673313698  
 152.5625873940 × 156.9388244395 × 161.1747180829  
 164.5951694887 × 168.9588930770 × 172.6883108433  
 176.5168506941 × 180.8998074117

SP ? node 259 single stat point energy = 43.71443295 detHess - 1613.64  
 - 2.9676629458 × 0.7406402070 × 5.1237039060  
 8.5901717166 × 12.7976717013 × 17.2344158408  
 20.6721430034 × 25.0783379946 × 29.4301565840  
 32.8668482191 × 37.2963634889 × 41.3339304886  
 44.8980276553 × 49.2551326523 × 52.7652198090  
 56.8739895083 × 61.3023728774 × 64.7316096366  
 69.1072251555 × 73.4750275303 × 76.9042827927  
 81.3314433329 × 85.4157383235 × 88.9414003616  
 93.2957764411 × 96.8355734404 × 100.9012924774  
 105.3289323224 × 108.7602317667 × 113.1219343276  
 117.5082332061 × 120.9396373680 × 125.3709733219  
 129.5137394120 × 133.0058551014 × 137.3698191626  
 140.9757726211 × 144.9673618481 × 149.3976045810  
 152.8425949311 × 157.1767173162 × 161.6077718990  
 165.0557525040 × 169.4962835081 × 173.7876534532  
 177.2375213444 × 181.6531429424

SP node138 energy = 43.53802830 detHess - 41.99  
 3.4698163155 × 7.0427631886 × 11.2962354719  
 14.6189675006 × 18.8144771096 × 22.9763388693  
 26.3042707702 × 30.5360515556 × 34.0303921237  
 38.0176856466 × 42.3043967364 × 45.6252189635  
 49.9278649071 × 53.8938194012 × 57.4012276430  
 61.6429933365 × 64.9688862772 × 69.1371484673  
 73.3098699447 × 76.6347911757 × 80.8898039518  
 84.4252228298 × 88.3612599967 × 92.6626355202  
 95.9723490184 × 100.2685714741 × 104.2863053166  
 107.7482025469 × 111.9968774427 × 115.3471742787  
 119.4868062631 × 123.7117006244 × 127.0179391542  
 131.2955929040 × 134.9503958802 × 138.7641404952  
 143.0662732767 × 146.3750340926 × 150.6474705053  
 154.7488595133 × 158.1405861679 × 162.3956458345  
 165.8141897593 × 169.8865584007 × 174.1759610672

```

177.4850394809 × 181.7942050171
iMin ? 391 energy = 42.64141336 detHess 3783.74
? begin a0 - min at 42.63875863889012`
6.6844750574 × 10.9487313130 × 14.2140845000
18.4764809898 × 22.3743969188 × 25.8983777187
30.1153545295 × 33.3686203015 × 37.5498452389
41.5823572445 × 44.9393617576 × 49.1138708059
52.3749587601 × 56.4944333202 × 60.5597000193
63.8609992614 × 68.0191576226 × 71.2879846525
75.3809314395 × 79.4565868417 × 82.7386012644
86.8915951124 × 90.1659524207 × 94.2480061321
98.3302863680 × 101.6044697118 × 105.7575309067
109.0398943236 × 113.1153374810 × 117.2087816178
120.4774229033 × 124.6358620640 × 127.9381141356
132.0028767126 × 136.1235953097 × 139.3843947824
143.5597135394 × 146.9195577997 × 150.9502094497
155.1340179993 × 158.3872524102 × 162.6060552837
166.1382868274 × 170.0285172203 × 174.2920015026
177.5576888428 × 181.8217117740
SP node 140 iMin 392 like above
node808 SP ? energy = 44.0899891115 detHess - 2910.69
9.9528322173 × 13.3330527371 × 17.4070227289
20.4892071655 × 24.5690220387 × 28.1145032923
31.8191355041 × 35.9161397035 × 39.0355688726
43.1276660107 × 46.4654343371 × 50.4150986154
54.5138214832 × 57.7182971668 × 61.8433787956
65.1332725677 × 69.1679250249 × 73.2554394776
76.5021273426 × 80.6417864561 × 83.9192324832
87.9823427999 × 92.0632006843 × 95.3265833359
99.4713593266 × 102.7439727197 × 106.8173592257
110.8939547300 × 114.1640480513 × 118.3097587417
121.5779032824 × 125.6560818889 × 129.7266363146
133.0007795371 × 137.1442740230 × 140.4030905724
144.4859886207 × 148.5416166058 × 151.8222150209
155.9579258592 × 159.1927939350 × 163.2841523999
167.2969263869 × 170.5975786547 × 174.7125617784
177.8896100644 × 181.9917098639
1090 iMin2 energy = 43.60669087 detHess 37.37
12.7333976827 × 16.7822339388 × 19.9518272438
24.0136558720 × 27.1757829286 × 31.2284591280
35.0947640517 × 38.4492980377 × 42.4856070084
45.5246605860 × 49.5633099762 × 52.9560815954
56.7847131422 × 60.8472041917 × 63.9941168843
68.0587343655 × 71.2528091832 × 75.2904137892
79.2204172223 × 82.5211605150 × 86.5663810546
89.6264571265 × 93.6823895097 × 97.2025766453
100.9084749930 × 104.9829803603 × 108.0911918454
112.1565667882 × 115.4139304750 × 119.4058403887
123.4230671494 × 126.6563745526 × 130.7271690852

```

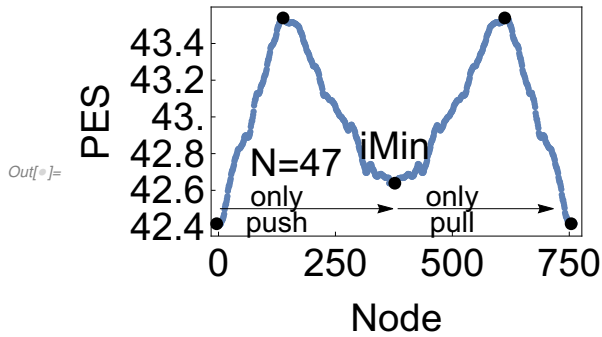
133.8589597056 × 137.9330800575 × 141.7145506927  
 145.1598192826 × 149.2075299536 × 152.2554048072  
 156.2970322078 × 159.6335338588 × 163.5244768039  
 167.5763753654 × 170.7501318041 × 174.8169606787  
 177.9871024201 × 182.0409299354  
 node1302 max bis 1354 energy = 45.4535925606 detHess - 248.15816  
 16.3602779562 × 19.6303730436 × 23.6043282186  
 26.5791814318 × 30.5463123818 × 33.7493632552  
 37.6754285918 × 41.5778128911 × 44.8080474546  
 48.7733387177 × 51.7417215013 × 55.7056370750  
 58.9228900789 × 62.8343880552 × 66.7484210123  
 69.9627555498 × 73.9268619073 × 76.8959078077  
 80.8622822011 × 84.0981067643 × 87.9969880862  
 91.9282575287 × 95.1269701199 × 99.0959055714  
 102.0740391515 × 106.0517884992 × 109.3389064629  
 113.2044819085 × 117.1769988381 × 120.3430970738  
 124.3298616814 × 127.3445682777 × 131.3532237461  
 134.8024742950 × 138.5338512278 × 142.5643521427  
 145.6654903681 × 149.6803005009 × 152.7966956095  
 156.8222848141 × 160.5933573641 × 164.0008275545  
 168.0038954872 × 171.0095050061 × 174.9937058242  
 178.1730209762 × 182.1342688411  
 SP node253 energy = 43.53914758 detHess - 65.12989  
 6.7232079258 × 11.0323900405 × 14.3422497785  
 18.6311536347 × 22.7033873499 × 26.1220911275  
 30.3764640031 × 33.7687048528 × 37.8704639524  
 42.1427378644 × 45.4509116595 × 49.7538694339  
 53.5672428393 × 57.2211324542 × 61.4979380453  
 64.8026690632 × 69.0284534174 × 73.1677609567  
 76.5168717741 × 80.7654932071 × 84.2209939478  
 88.2427930485 × 92.5392162473 × 95.8451143237  
 100.1506602778 × 104.0850028739 × 107.6184946954  
 111.8723626522 × 115.1854339634 × 119.3676618237  
 123.5370310256 × 126.8569631884 × 131.1064699051  
 134.6110522019 × 138.5751342645 × 142.8774671218  
 146.1819116456 × 150.4815723588 × 154.4715354398  
 157.9529524062 × 162.2008347420 × 165.5311237845  
 169.6881521392 × 173.8873168608 × 177.1954008495  
 181.4574566068 × 185.0342839248  
 next gMin node390 energy = 42.4180122 detHess 846.318735  
 6.7430663390 × 11.0701300265 × 14.3999717060  
 18.6954785130 × 22.8375168171 × 26.2306765645  
 30.5141052494 × 34.0130761947 × 38.0299888397  
 42.3717740644 × 45.7143482930 × 50.0439491127  
 54.1538241793 × 57.5844427542 × 61.8753190796  
 65.3489965781 × 69.4073245395 × 73.7537946762  
 77.1029744743 × 81.4431957813 × 85.5474504155  
 88.9889823041 × 93.2849105355 × 96.7600051023  
 100.8237329561 × 105.1760643948 × 108.5306589177

```

112.8746561636 × 116.9978097868 × 120.4328530492
124.7364776188 × 128.2401422060 × 132.2793548578
136.6449400398 × 140.0106280435 × 144.3543980137
148.5399713194 × 151.9515558013 × 156.2779790336
159.8858950501 × 163.8228921413 × 168.2039037845
171.5931854391 × 175.9124662351 × 180.2150254444
183.6071869963 × 187.9839034213

```

```
xxx = Join[NT47eps5m9gMin, NT47eps5m9gMinpull];
```



```

node470 energy = 43.8593 detHess 273.650 no SP ?
0.6374379579 × 5.0645809262 × 8.5531050511
12.8070357796 × 17.2993151821 × 20.7918058432
25.2160972228 × 29.7236481007 × 33.2385688596
37.7219436826 × 42.2281483616 × 45.7511150651
50.2545394780 × 54.7470211298 × 58.2660305897
62.7743183943 × 67.2251032585 × 70.7263821499
75.2268391063 × 79.5567492556 × 83.0361605956
87.4923249075 × 91.4935807830 × 95.0658423054
99.3679266175 × 102.7519987421 × 106.9320109108
111.2296110877 × 114.5709714803 × 118.9076155156
122.7887848885 × 126.4064323057 × 130.7003783115
134.0464449498 × 138.2559462830 × 142.4913142558
145.8267365783 × 150.1292339220 × 153.8129318448
157.6214118373 × 161.9455530059 × 165.2814569785
169.5574712229 × 173.7450690022 × 177.1149270808
181.4115618654 × 184.9902750401
node571 energy = 43.726962 detHess 18.12605
0.6262465129 × 5.0437593610 × 8.5156748160
12.7765432522 × 17.2460404302 × 20.7160728323
25.1426976259 × 29.5792786521 × 33.0509905580
37.5206380063 × 41.8127575951 × 45.2788325944
49.7075332334 × 53.6067863208 × 57.3076531193
61.6967055569 × 65.1791615591 × 69.3749796960
73.8278216737 × 77.2806637291 × 81.6853366383
86.0939371825 × 89.5471601077 × 93.9484967419
98.0549983497 × 101.5439482663 × 105.8813129841
109.4153647925 × 113.4638768410 × 117.8707775353
121.2795413867 × 125.6349215178 × 129.9615209978

```

133.3728325323  $\times$  137.7736708782  $\times$  141.7337844981  
 145.3396451713  $\times$  149.6809914403  $\times$  153.1242263238  
 157.2943726498  $\times$  161.6776123540  $\times$  165.0673896670  
 169.4482323937  $\times$  173.6325909476  $\times$  177.0689817079  
 181.4139195474  $\times$  185.0425790097  
 node623 en = 43.71076041 detHess - 1310.44 SP?  
 0.5607702299 4.9760930985  $\times$  8.4259848731  
 12.7166949223  $\times$  17.1571637625  $\times$  20.6050162716  
 25.0358667775  $\times$  29.3699942835  $\times$  32.8148912401  
 37.2450614323  $\times$  41.2366224876  $\times$  44.8425282139  
 49.2064272375  $\times$  52.6984330445  $\times$  56.8412422170  
 61.2724696173  $\times$  64.7037621438  $\times$  69.0900617293  
 73.4513872620  $\times$  76.8825866351  $\times$  81.3100529688  
 85.3746399445  $\times$  88.9151437045  $\times$  93.2696444871  
 96.7946881226  $\times$  100.8799789046  $\times$  105.3072410963  
 108.7365433812  $\times$  113.1046696313  $\times$  117.4801299176  
 120.9094165685  $\times$  125.3378255180  $\times$  129.4460912799  
 132.9565261411  $\times$  137.3135984965  $\times$  140.8772077013  
 144.9153748105  $\times$  149.3449053588  $\times$  152.7815382795  
 157.1335717110  $\times$  161.5395180227  $\times$  164.9771743584  
 169.4138821054  $\times$  173.6205475133  $\times$  177.0872928271  
 181.4700825452  $\times$  185.1768940237  
 no real movement : useless

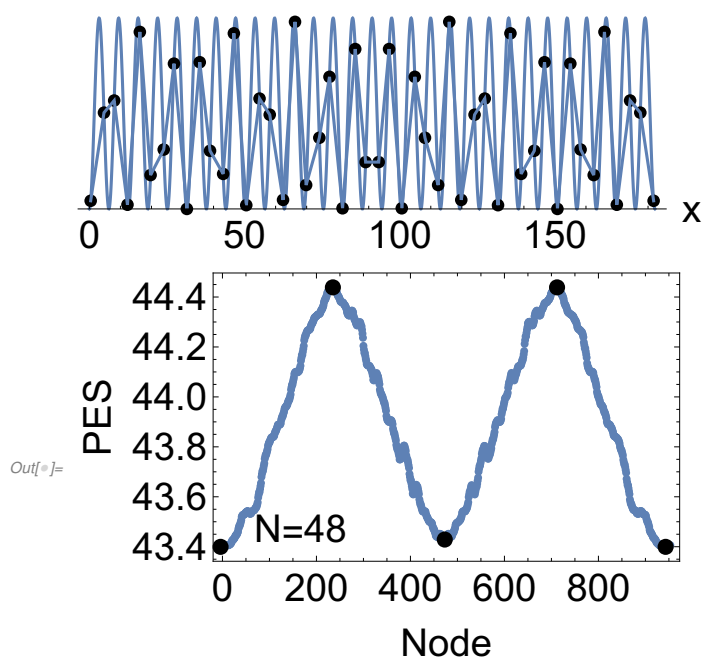
min node302 in between TPs ? energy = 42.4197371288 detHess 823.998  
 0.5101742344  $\times$  4.8870777320  $\times$  8.2792005475  
 12.5822718115  $\times$  16.9012436027  $\times$  20.2906322548  
 24.6716190602  $\times$  28.6076525165  $\times$  32.2165051660  
 36.5431169219  $\times$  39.9545323040  $\times$  44.1406044787  
 48.4843235810  $\times$  51.8500874100  $\times$  56.2157559014  
 60.2546279961  $\times$  63.7586185183  $\times$  68.0622910655  
 71.4971766786  $\times$  75.6205881304  $\times$  79.9645360483  
 83.3191341969  $\times$  87.6714934443  $\times$  91.7349304695  
 95.2102384755  $\times$  99.5061457820  $\times$  102.9474328007  
 107.0519486459  $\times$  111.3920280687  $\times$  114.7411404819  
 119.0875889491  $\times$  123.1452769612  $\times$  126.6193580432  
 130.9101292352  $\times$  134.3401397494  $\times$  138.4505766731  
 142.7797310586  $\times$  146.1220975359  $\times$  150.4637406122  
 154.4787811406  $\times$  157.9790501581  $\times$  162.2622838512  
 165.6540680297  $\times$  169.7973586864  $\times$  174.0914275108  
 177.4209202866  $\times$  181.7472890814  
 it goes back to start : useless

```
## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ## ##
```

```
N = 48 GOLD a0 - min
```

```
ENERGY 43.3994997884256
```

```
SetX = {0.415947235449756, 4.70322589289429, 7.990546531131,
12.268556667353304, 16.253135717562884, 19.7191492186061,
23.9492293406214, 27.253371389364826, 31.4101248013213, 35.56107651124899,
38.86864053547988, 43.09677117373711, 46.550653836523765,
50.546890081962786, 54.82083450693, 58.10708391218712, 62.393256683995595,
66.2547603303707, 69.8386451590724, 74.08462196288961, 77.3634913795079,
81.56556065398999, 85.65204054558963, 89.00123803079266,
93.21113587741534, 96.56033336261837, 100.646813254218,
104.84888252870007, 108.12775194531837, 112.3737287491355,
115.95761357783, 119.81911722421238, 124.10528999602086,
127.39153940126934, 131.6654838262, 135.66172007168424,
139.1156027344709, 143.34373337272814, 146.65129739695,
150.80224910688668, 154.95900251884316, 158.26314456758652,
162.49322468960, 165.9592381906451, 169.9438172408547,
174.22182737707675, 177.509148015313, 181.79642667275826}
```



```
SP node235 energy = 44.438664 detHess - 1535.330
0.4611615065 × 4.7878607668 × 8.1174066707
12.4124563758 × 16.5541988173 × 19.9471506450
24.2302162317 × 27.7283878442 × 31.7457862981
36.0870951063 × 39.4292533554 × 43.7587430000
47.8665359210 × 51.2980892190 × 55.5882806019
59.0590584324 × 63.1199518325 × 67.4649750913
70.8131383309 × 75.1532094015 × 79.2507102894
82.6956997294 × 86.9897952858 × 90.4563017572
94.5279032375 × 98.8759791794 × 102.2275969567
106.5713078623 × 110.6745562134 × 114.1193124961
118.4172098119 × 121.8940211146 × 125.9584346911
```



130.3133283805 × 133.6701912554 × 138.0154479951  
 142.1477200110 × 145.5795257675 × 149.8867320227  
 153.4046092732 × 157.4309769616 × 161.8015049293  
 165.1720778629 × 169.5143528430 × 173.7253573336  
 177.1301260539 × 181.4672731438 × 185.1263743559  
 iMin node473 energy = 43.4286959 detHess 391.268  
 0.5297211484 × 4.9210194868 × 8.3340023433  
 12.6339705592 × 17.0014872459 × 20.4071982686  
 24.8128227789 × 28.9039581400 × 32.4062523949  
 36.7447513794 × 40.2673061923 × 44.3323509682  
 48.7403441061 × 52.1493793883 × 56.5097977981  
 60.8313560287 × 64.2438237876 × 68.6437052507  
 72.5895122562 × 76.2085518226 × 80.5521047739  
 83.9915426162 × 88.1698957084 × 92.5521110479  
 95.9421127989 × 100.3244935711 × 104.5018668690  
 107.9417751081 × 112.2850796208 × 115.9025433583  
 119.8500837925 × 124.2501208143 × 127.6624900541  
 131.9846621200 × 136.3445958750 × 139.7536355687  
 144.1615597784 × 148.2249875966 × 151.7486715008  
 156.0870626347 × 159.5880203951 × 163.6807095613  
 168.0859631985 × 171.4912746833 × 175.8591537782  
 180.1570552884 × 183.5700592394 × 187.9604408556  
 SP node712 energy = 44.43918422 detHess - 1678.66  
 3.3516371484 × 7.0191682179 × 11.3580152724  
 14.7618281867 × 18.9768023782 × 23.3186799158  
 26.6900007502 × 31.0612299635 × 35.0851533353  
 38.6055860546 × 42.9133536730 × 46.3444285389  
 50.4783997278 × 54.8236831062 × 58.1808299739  
 62.5360945466 × 66.5998935942 × 70.0774218144  
 74.3755062227 × 77.8200635291 × 81.9238196490  
 86.2676192637 × 89.6193688558 × 93.9675943483  
 98.0392861524 × 101.5058601029 × 105.8000771199  
 109.2453029997 × 113.3426961727 × 117.6829955282  
 121.0313142597 × 125.3764349296 × 129.4382192783  
 132.9085015557 × 137.1988977667 × 140.6313886174  
 144.7383747108 × 149.0685769714 × 152.4110900218  
 156.7526419762 × 160.7729992872 × 164.2691578531  
 168.5525684840 × 171.9477688845 × 176.0874969647  
 180.3848729950 × 183.7150171092 × 188.0428396980  
 gMin node943 energy = 43.4006579 detHess 110.4923  
 6.6991820049 × 10.9864579512 × 14.2737754511  
 18.5517765105 × 22.5363794998 × 26.0023669424  
 30.2324419188 × 33.5365891218 × 37.6933307439  
 41.8442912990 × 45.1518483287 × 49.3799807550  
 52.8338805686 × 56.8300991613 × 61.1040487705  
 64.3902988318 × 68.6764726259 × 72.5380050298  
 76.1218615589 × 80.3678333643 × 83.6467044205  
 87.8487646755 × 91.9352541365 × 95.2844420833  
 99.4943399349 × 102.8435469713 × 106.9300172937

$111.1320956057 \times 114.4109633877 \times 118.6569452045$   
 $122.2408583898 \times 126.1023332265 \times 130.3885049782$   
 $133.6747537311 \times 137.9486929645 \times 141.9449469120$   
 $145.3988123833 \times 149.6269412352 \times 152.9345122830$   
 $157.0854551233 \times 161.2422203746 \times 164.5463572549$   
 $168.7764425491 \times 172.2424822233 \times 176.2270372333$   
 $180.5050564876 \times 183.7923802814 \times 188.0796616631$

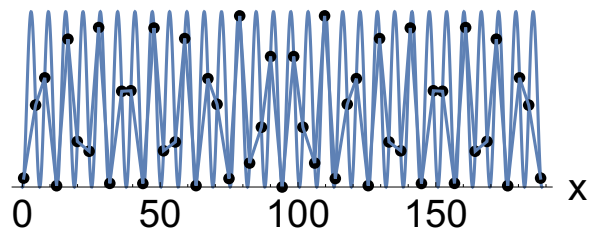
ok best movement by 2 pi

### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###

N = 49 GOLD a0 - min

ENERGY 44.25270652301314

SetX = {0.454937963177634, 4.777566786675109, 8.102318641577165,  
 12.396393148077848, 16.52130781250031, 19.919633146383717,  
 24.19519607337857, 27.664650870082713, 31.706713155924337,  
 36.03548133917543, 39.36855553830332, 43.69676805654144,  
 47.74331528272105, 51.2092949451886, 55.485075225653084,  
 58.88674962515496, 63.008221796853384, 67.30514954557121,  
 70.63052402530572, 74.95436956256248, 78.84879176991127,  
 82.43913148702357, 86.71673993401265, 90.04604253591206, 94.2477712174932,  
 98.4494914762062, 101.77879811508323, 106.05640368787085,  
 109.646723198027, 113.54116782529503, 117.8650162553242,  
 121.19039294908467, 125.48732679123233, 129.6087942763007,  
 133.01047479465228, 137.28625711160058, 140.7522344106128,  
 144.79878693532456, 149.12700026376734, 152.4600753199288,  
 156.7888443010767, 160.83090576213974, 164.30036158477088,  
 168.57592453280625, 171.97424935443038, 176.0991646325701,  
 180.39323896510396, 183.71799148120547, 188.0406207843042}



```

SP node 318 energy = 45.4499933 detHess - 376.71996
0.5396549870 × 4.9286630940 × 8.3409674286
12.6370191746 × 17.0036607250 × 20.4079039303
24.8120696563 × 28.9010314123 × 32.4035201048
36.7407119722 × 40.2596310256 × 44.3274716184
48.7336730710 × 52.1406344180 × 56.5016360184
60.8156232095 × 64.2271864388 × 68.6233954964
72.5475297324 × 76.1848506852 × 80.5301468032
83.9621641194 × 88.1525701669 × 92.5298470161
95.9179288911 × 100.3010793197 × 104.4563636184
107.9056678258 × 112.2422997960 × 115.8243374017
119.8091904212 × 124.2097045726 × 127.6170314818
131.9520819957 × 136.2923230312 × 139.6991407871
144.1007882742 × 148.1015588903 × 151.6703340484
156.0059385961 × 159.4625750098 × 163.6071539472
167.9936449464 × 171.3834602838 × 175.7594198486
179.9664249830 × 183.3928185337 × 187.7439873743
191.4123681987
node638 energy = 44.53662983 detHess 1662.141
0.5507991100 × 4.9696431631 × 8.4213949855
12.7164408036 × 17.1609941551 × 20.6124738453
25.0455548785 × 29.3915599767 × 32.8386766361
37.2748544543 × 41.2993881520 × 44.8811536409
49.2455347107 × 52.7578351072 × 56.8747167142
61.3119009690 × 64.7503775128 × 69.1290033693
73.5215937622 × 76.9605878572 × 81.3995464022
85.5603597256 × 89.0488384626 × 93.4212674524
97.0581234151 × 101.0202036169 × 105.4522378532
108.9060091328 × 113.2270711264 × 117.6775050863
121.1366673073 × 125.5787013109 × 129.9358328166
133.3883244172 × 137.8324602408 × 141.8893741592
145.4514011108 × 149.8198871965 × 153.3597968810
157.4462601136 × 161.8911923923 × 165.3410380591
169.7090284232 × 174.1400022004 × 177.5947284596
182.0449699067 × 186.3285881485 × 189.7847169146
194.2014469852 iMin ok

```

