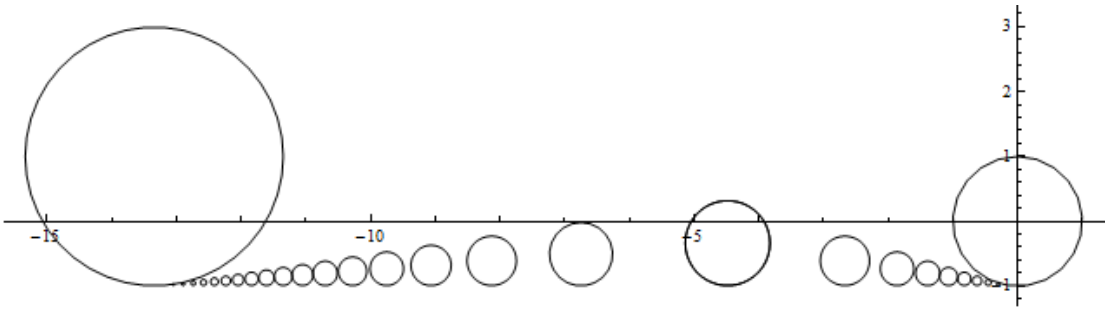
GeneticsOfPolygons.org

Summery of dynamics of the regular 21-gon: N = 21

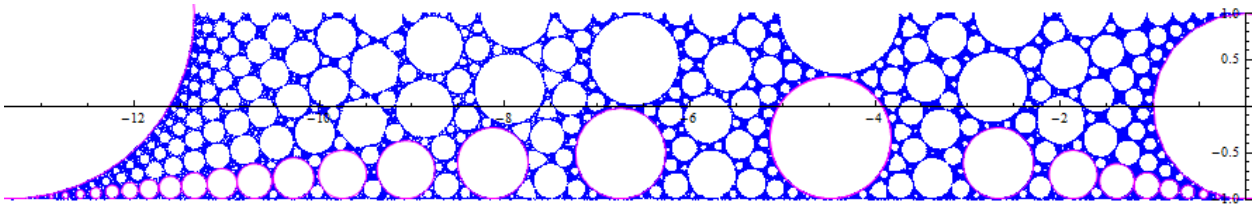
This the third 'Thrice-prime' polygon and it will be interesting to see if there are remnants of the dynamics of N = 7 or N= 14.

Using Nodd.nb the First Family is shown below



GenScale[21] = scale[10] ≈ 0.011295333315517565564705456 00

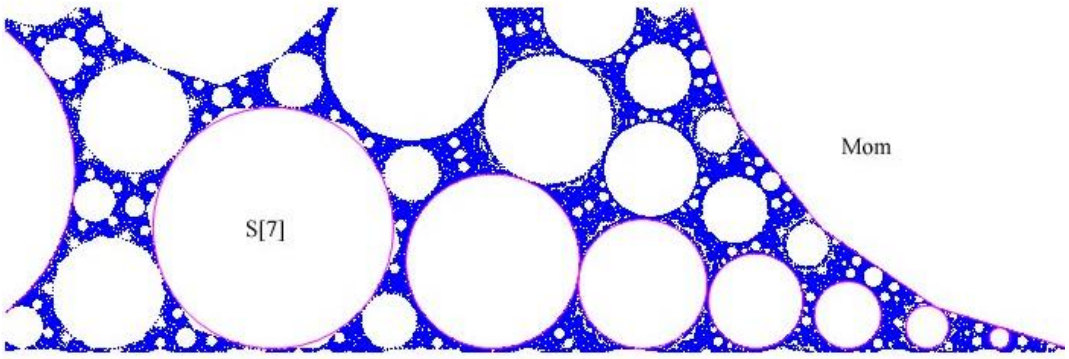
Below is a web scan with the First Family in magenta



To see the detail around S[7], use the probe point q1= {-1.5953723181002, -.6723100023466};

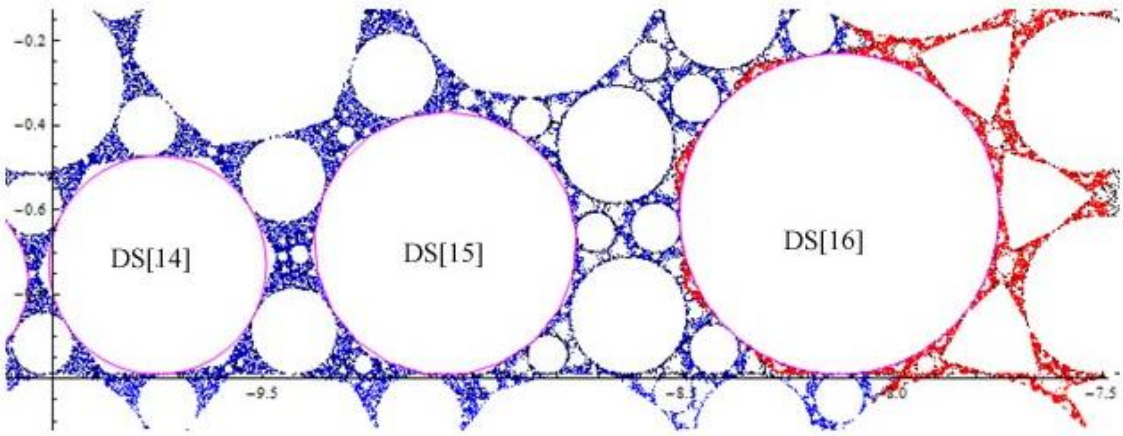
Mbox[{{{-2.437,-1.223},{-0.07072,-0.2598}}}]; Datumcrop[q1,3,1000000, "temp"];

Show[Graphics[{AbsolutePointSize[1.0],Blue,Point[Wcrop],Magenta,poly/@FirstFamily}, PlotRange->{{left,right},{bottom,top}}]]

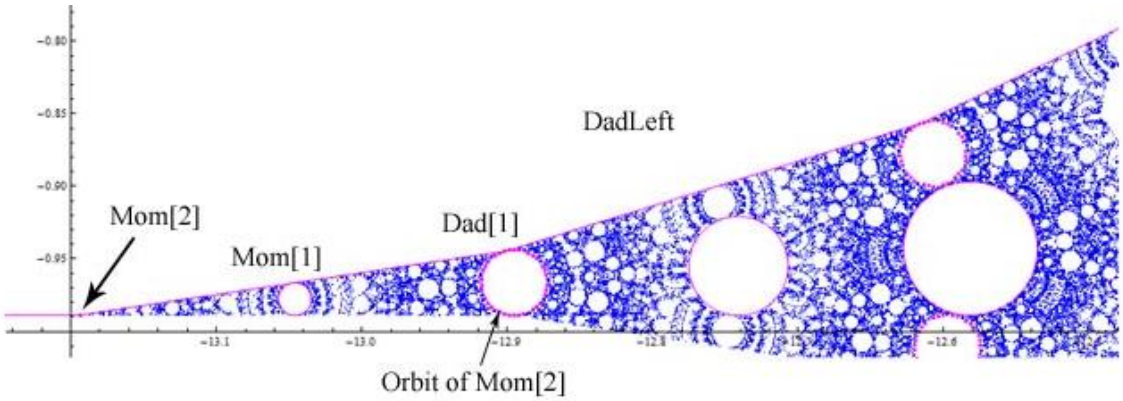


S[7] would normally have 42 sides, but now it appears to have just 12 sides. Some of the original vertices are preserved and extended edges create new vertices, This is what we call a 'woven' polygon because it typically consists of two regular polygons with alternating vertices.

The matching bud on Dad's side is DS[14] and it is shown below. It also appears to have 12 sides. DS[15] also has extended edges, but it is not clear why. DS[16] seems to be a normal 2N-gon but it has dynamics which would encourage extensions.

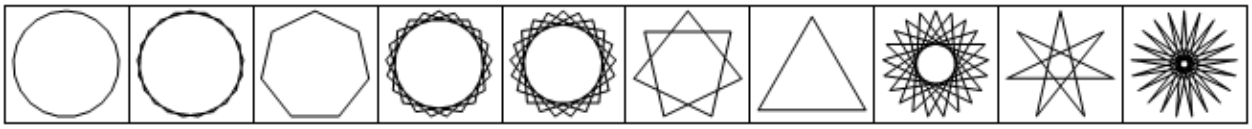


Below is generation1, showing Mom[1] (period 378) and Dad[1] (period 357). Mom[2] would be at the arrow and this point is period 11466. The magenta 'halos' around the Dad[1]'s are the orbit of this point, indicating that these Dad's support Mom[2]'s on most edges. This is an encouraging sign of stability for future generations.



Projections

GraphicsGrid[{Table[Graphics[poly[Wc[[k]]]],{k,1,HalfN}]},Frame->All]



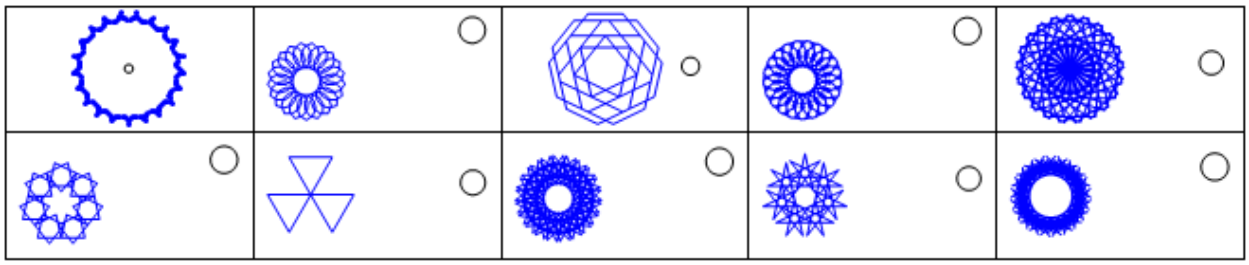
Example 1: **q1=cDS[1]** = cMom[1] ≈ {-13.04598810724536,-0.97766165245025709013}

This point is period 378 so the projections will have period 189

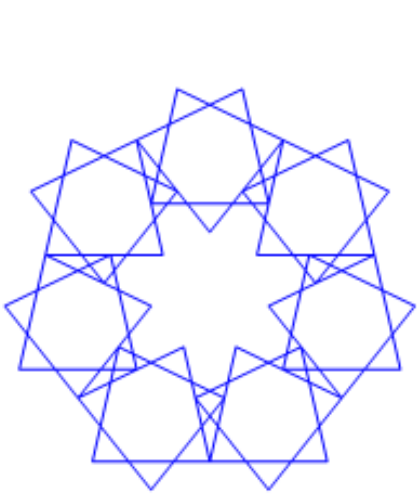
Ind = IND[q1,500]; k =190; (*k is one more than half of the period to close the plot*)

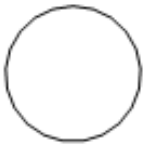
Px=Table[Graphics[{poly[Mom],Blue,Line[PIM[q1,k,j]]}],{j,1,HalfN-1}];
Px[[1]]=Graphics[{poly[Mom],AbsolutePointSize[3.0],Blue,Point[PIM[q1,k,1]]}];
(*plot the P1 projection with points instead of lines*)

GraphicsGrid[{{Px[[1]],Px[[2]],Px[[3]],Px[[4]], Px[[5]]},{Px[[6]],Px[[7]], Px[[8]], Px[[9]]}},Frame->All]



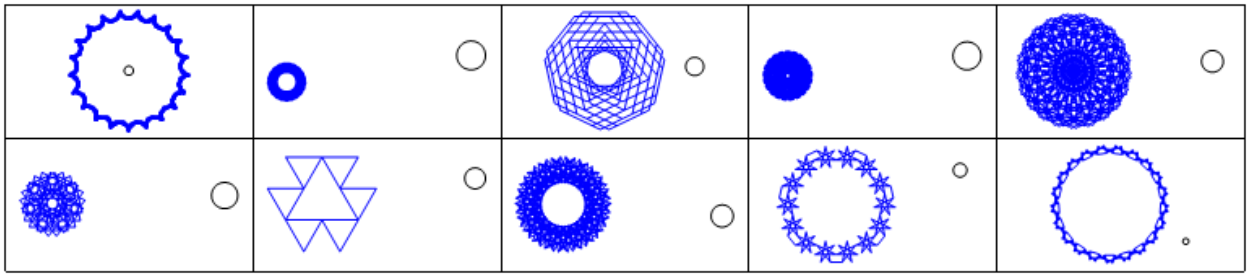
Px[[6]] is shown below



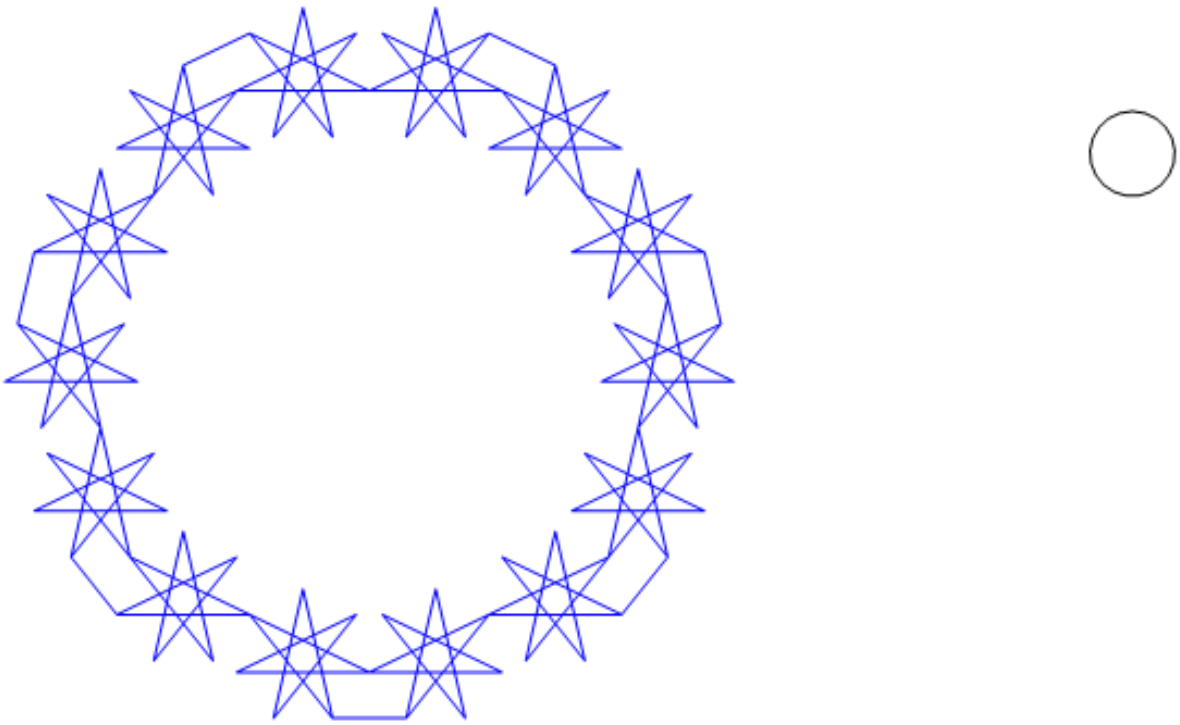


Example 2: q1=cDS[2] = cDad[1] ≈ {-12.89526235899462,-0.966366319134739524}
Period 357 so projections will have this same period.

k= 357;



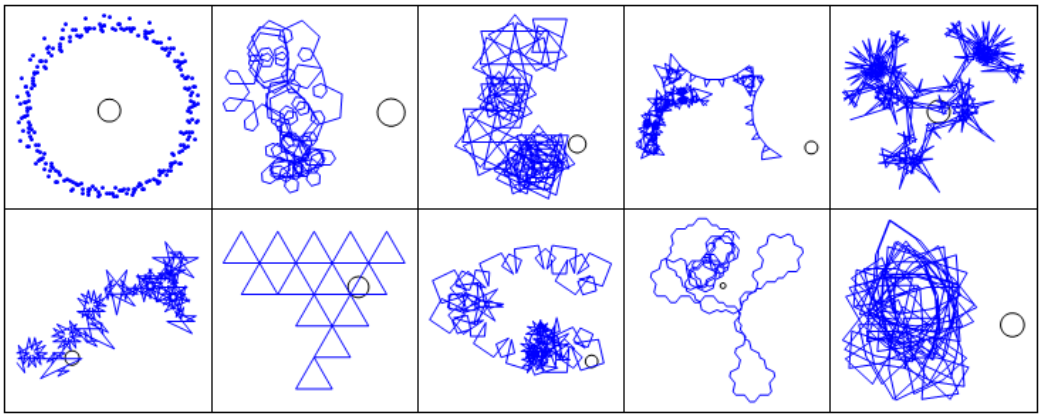
Px[[9]]



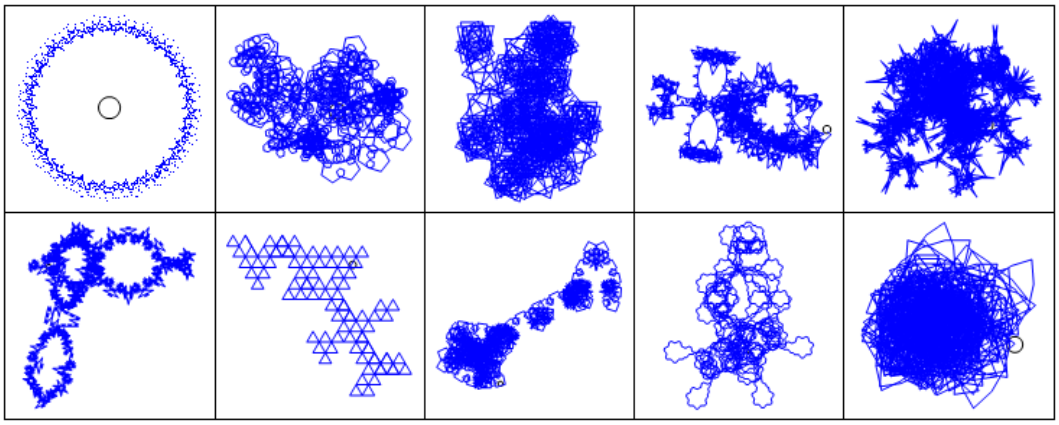
Example 3: A point from the red orbit around DS[16] shown above:
q1 = {-7.694101350,-0.69791001231167}

Ind = IND[q1,200000];

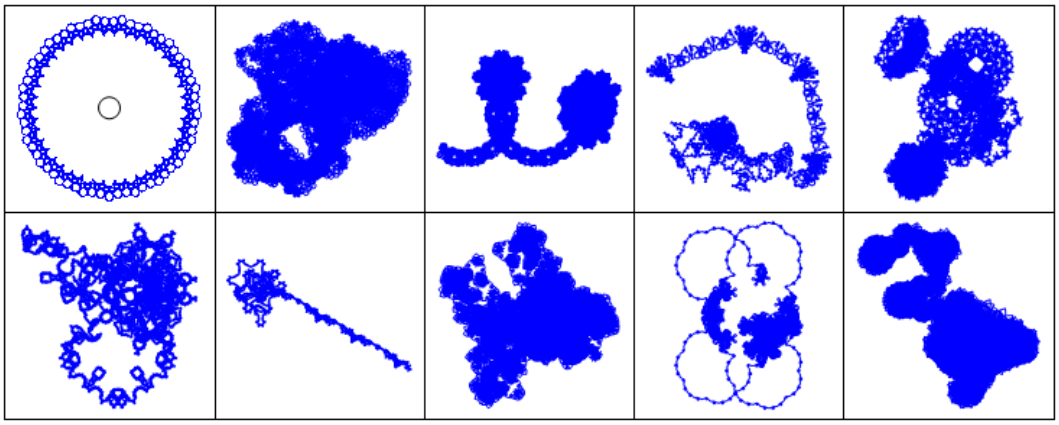
k = 250;



k = 2000



k = 100000;



Px[[4]]