# Reconstruct Orbits from Symbols - Additional Sequences

Additional figures that were not selected for the paper

## Configuration A : Swapping 3 cores between 3 sequences with shared surrounding

```
In[•]:= s = 7;
        int = s - 4;
        m = RandomInteger[{0, int}, {29, 21}];
```

From the m matrix defined above, we generate three matrices m1, m2, m3 identical, except to small submatrices B, C and D that are swapped between m1, m2 and m3. The blocks B (green), C (red) and D (cyan) is surrounded by a bigger frame A (blue) common to all three swapped sequences

```
In[•]:= pos1 = {2, 1};
        pos2 = {5, 12};
        pos3 = {17, 8};

        tout = 11;
        nout = 8;
        tin = 3;
        nin = 2;
        posin = {4, 3};

        {n1, n2, n3} = swapping3blocks[int, m, pos1, pos2, pos3, posin, tout, nout, tin, nin] ;

        n1C = coloring2blocks[n1, pos1, posin, tout, nout, tin, nin, Blue, Green];
        n1C = coloring2blocks[n1C, pos2, posin, tout, nout, tin, nin, Blue, Red];
        n1C = coloring2blocks[n1C, pos3, posin, tout, nout, tin, nin, Blue, Cyan];

        n2C = coloring2blocks[n2, pos1, posin, tout, nout, tin, nin, Blue, Red];
        n2C = coloring2blocks[n2C, pos2, posin, tout, nout, tin, nin, Blue, Cyan];
        n2C = coloring2blocks[n2C, pos3, posin, tout, nout, tin, nin, Blue, Green];

        n3C = coloring2blocks[n3, pos1, posin, tout, nout, tin, nin, Blue, Cyan];
        n3C = coloring2blocks[n3C, pos2, posin, tout, nout, tin, nin, Blue, Green];
        n3C = coloring2blocks[n3C, pos3, posin, tout, nout, tin, nin, Blue, Red];

        n1C // MatrixForm
        n2C // MatrixForm
        n3C // MatrixForm
```

*Out[◦]//MatrixForm=*

```
0 0 0 2 2 3 1 0 3 2 2 1 3 0 1 2 2 0 1 2 1
0 3 3 3 0 1 0 0 3 2 1 0 3 1 3 1 0 3 3 0 0
1 0 0 0 3 2 1 2 3 3 1 1 2 3 0 0 0 1 2 3 0
1 0 2 0 3 0 3 2 2 3 1 3 0 2 3 3 1 2 0 1 0
3 2 2 3 1 0 3 1 2 3 0 0 3 3 3 0 1 0 0 3 2
0 1 3 3 3 0 2 3 2 2 0 1 0 0 0 3 2 1 2 3 1
1 0 1 0 0 3 0 0 3 0 0 1 0 2 0 3 0 3 2 0 0
0 1 0 3 1 1 3 1 3 1 0 3 2 2 3 1 0 3 1 3 3
3 0 2 0 0 3 0 3 0 1 1 0 1 3 0 0 0 2 3 1 0
0 2 0 3 2 1 3 2 1 0 3 1 0 1 2 3 3 0 0 2 2
3 0 3 1 2 3 3 3 3 3 3 0 1 0 1 0 1 3 1 0 2
1 1 0 1 3 0 2 1 3 3 1 3 0 2 0 0 3 0 3 0 2
0 3 1 2 0 0 1 0 0 0 2 0 2 0 3 2 1 3 2 1 3
3 0 2 3 2 2 2 3 2 1 3 3 0 3 1 2 3 3 3 3 0
2 1 2 2 3 2 0 0 1 1 3 1 1 0 1 3 0 2 1 3 2
1 2 2 1 0 1 1 0 3 0 2 3 0 1 1 2 2 1 0 1 1
3 0 2 1 0 2 0 0 3 3 3 0 1 0 0 3 2 1 3 1 2
2 0 2 2 2 1 3 1 0 0 0 3 2 1 2 0 2 0 2 0 3
3 1 2 1 3 0 2 1 0 2 0 3 0 3 2 1 0 0 2 3 0
0 3 2 0 0 3 0 3 2 2 3 1 0 3 1 0 2 2 2 1 1
2 1 0 3 2 2 2 0 1 3 1 1 0 2 3 1 2 0 3 2 3
3 1 3 3 2 3 1 1 0 1 3 0 3 0 0 2 1 0 1 3 0
3 3 0 3 2 2 2 0 1 0 2 1 1 3 1 1 1 1 3 3 2
2 1 2 0 0 3 1 3 0 2 0 0 3 0 3 0 2 3 2 3 0
2 1 2 0 0 0 3 0 2 0 3 2 1 3 2 0 3 0 0 2 2
0 3 0 1 0 1 2 3 0 3 1 2 3 3 3 0 2 3 0 2 1
2 0 2 1 3 0 0 1 1 0 1 3 0 2 1 3 3 1 2 3 1
0 0 0 3 1 2 0 1 2 1 2 1 3 2 1 0 2 0 0 3 3
1 1 3 3 2 3 0 1 1 2 2 2 2 1 1 0 1 3 2 2 1
```

Out[ ]//MatrixForm=

```
0 0 0 2 2 3 1 0 3 2 2 1 3 0 1 2 2 0 1 2 1
0 3 3 3 0 1 0 0 3 2 1 0 3 1 3 1 0 3 3 0 0
1 0 0 0 3 2 1 2 3 3 1 1 2 3 0 0 0 1 2 3 0
1 0 2 0 3 0 3 2 2 3 1 3 0 2 3 3 1 2 0 1 0
3 2 2 3 1 0 3 1 2 3 0 0 3 3 3 0 1 0 0 3 2
0 1 3 0 0 0 2 3 2 2 0 1 0 0 0 3 2 1 2 3 1
1 0 1 2 3 3 0 0 3 0 0 1 0 2 0 3 0 3 2 0 0
0 1 0 1 0 1 3 1 3 1 0 3 2 2 3 1 0 3 1 3 3
3 0 2 0 0 3 0 3 0 1 1 0 1 3 1 1 0 2 3 1 0
0 2 0 3 2 1 3 2 1 0 3 1 0 1 3 0 3 0 0 2 2
3 0 3 1 2 3 3 3 3 3 3 0 1 0 2 1 1 3 1 0 2
1 1 0 1 3 0 2 1 3 3 1 3 0 2 0 0 3 0 3 0 2
0 3 1 2 0 0 1 0 0 0 2 0 2 0 3 2 1 3 2 1 3
3 0 2 3 2 2 2 3 2 1 3 3 0 3 1 2 3 3 3 3 0
2 1 2 2 3 2 0 0 1 1 3 1 1 0 1 3 0 2 1 3 2
1 2 2 1 0 1 1 0 3 0 2 3 0 1 1 2 2 1 0 1 1
3 0 2 1 0 2 0 0 3 3 3 0 1 0 0 3 2 1 3 1 2
2 0 2 2 2 1 3 1 0 0 0 3 2 1 2 0 2 0 2 0 3
3 1 2 1 3 0 2 1 0 2 0 3 0 3 2 1 0 0 2 3 0
0 3 2 0 0 3 0 3 2 2 3 1 0 3 1 0 2 2 2 1 1
2 1 0 3 2 2 2 0 1 3 3 3 0 2 3 1 2 0 3 2 3
3 1 3 3 2 3 1 1 0 1 0 0 3 0 0 2 1 0 1 3 0
3 3 0 3 2 2 2 0 1 0 3 1 1 3 1 1 1 1 3 3 2
2 1 2 0 0 3 1 3 0 2 0 0 3 0 3 0 2 3 2 3 0
2 1 2 0 0 0 3 0 2 0 3 2 1 3 2 0 3 0 0 2 2
0 3 0 1 0 1 2 3 0 3 1 2 3 3 3 0 2 3 0 2 1
2 0 2 1 3 0 0 1 1 0 1 3 0 2 1 3 3 1 2 3 1
0 0 0 3 1 2 0 1 2 1 2 1 3 2 1 0 2 0 0 3 3
1 1 3 3 2 3 0 1 1 2 2 2 2 1 1 0 1 3 2 2 1
```

Out[•]//MatrixForm=

```
0 0 0 2 2 3 1 0 3 2 2 1 3 0 1 2 2 0 1 2 1
0 3 3 3 0 1 0 0 3 2 1 0 3 1 3 1 0 3 3 0 0
1 0 0 0 3 2 1 2 3 3 1 1 2 3 0 0 0 1 2 3 0
1 0 2 0 3 0 3 2 2 3 1 3 0 2 3 3 1 2 0 1 0
3 2 2 3 1 0 3 1 2 3 0 0 3 3 3 0 1 0 0 3 2
0 1 3 1 1 0 2 3 2 2 0 1 0 0 0 3 2 1 2 3 1
1 0 1 3 0 3 0 0 3 0 0 1 0 2 0 3 0 3 2 0 0
0 1 0 2 1 1 3 1 3 1 0 3 2 2 3 1 0 3 1 3 3
3 0 2 0 0 3 0 3 0 1 1 0 1 3 3 3 0 2 3 1 0
0 2 0 3 2 1 3 2 1 0 3 1 0 1 0 0 3 0 0 2 2
3 0 3 1 2 3 3 3 3 3 3 0 1 0 3 1 1 3 1 0 2
1 1 0 1 3 0 2 1 3 3 1 3 0 2 0 0 3 0 3 0 2
0 3 1 2 0 0 1 0 0 0 2 0 2 0 3 2 1 3 2 1 3
3 0 2 3 2 2 2 3 2 1 3 3 0 3 1 2 3 3 3 3 0
2 1 2 2 3 2 0 0 1 1 3 1 1 0 1 3 0 2 1 3 2
1 2 2 1 0 1 1 0 3 0 2 3 0 1 1 2 2 1 0 1 1
3 0 2 1 0 2 0 0 3 3 3 0 1 0 0 3 2 1 3 1 2
2 0 2 2 2 1 3 1 0 0 0 3 2 1 2 0 2 0 2 0 3
3 1 2 1 3 0 2 1 0 2 0 3 0 3 2 1 0 0 2 3 0
0 3 2 0 0 3 0 3 2 2 3 1 0 3 1 0 2 2 2 1 1
2 1 0 3 2 2 2 0 1 3 0 0 0 2 3 1 2 0 3 2 3
3 1 3 3 2 3 1 1 0 1 2 3 3 0 0 2 1 0 1 3 0
3 3 0 3 2 2 2 0 1 0 1 0 1 3 1 1 1 1 3 3 2
2 1 2 0 0 3 1 3 0 2 0 0 3 0 3 0 2 3 2 3 0
2 1 2 0 0 0 3 0 2 0 3 2 1 3 2 0 3 0 0 2 2
0 3 0 1 0 1 2 3 0 3 1 2 3 3 3 0 2 3 0 2 1
2 0 2 1 3 0 0 1 1 0 1 3 0 2 1 3 3 1 2 3 1
0 0 0 3 1 2 0 1 2 1 2 1 3 2 1 0 2 0 0 3 3
1 1 3 3 2 3 0 1 1 2 2 2 2 1 1 0 1 3 2 2 1
```

In[•]:=

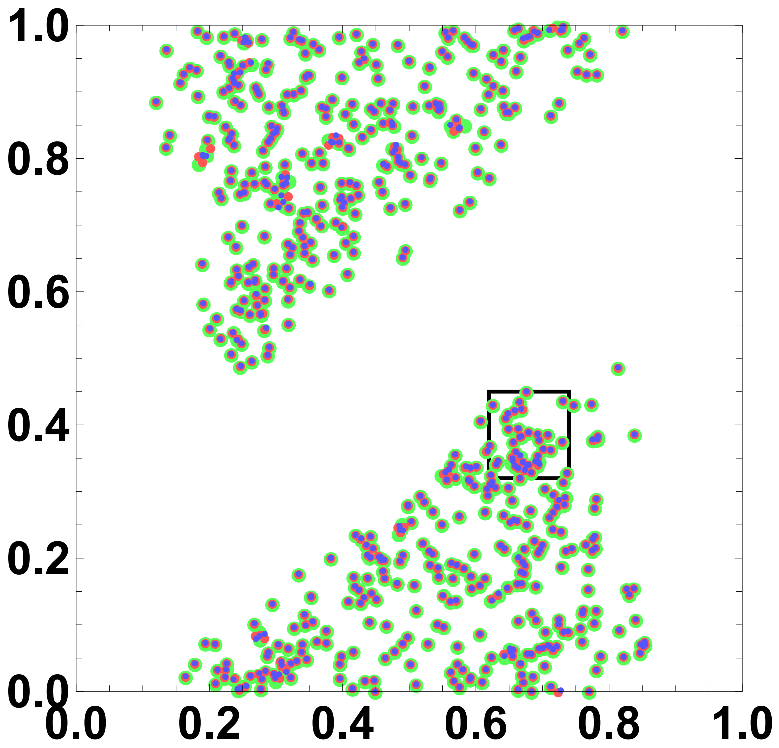
## Evaluating and Plotting;

```
{Q1, P1} = Orbits[s, n1];
{Q2, P2} = Orbits[s, n2];
{Q3, P3} = Orbits[s, n3];
```

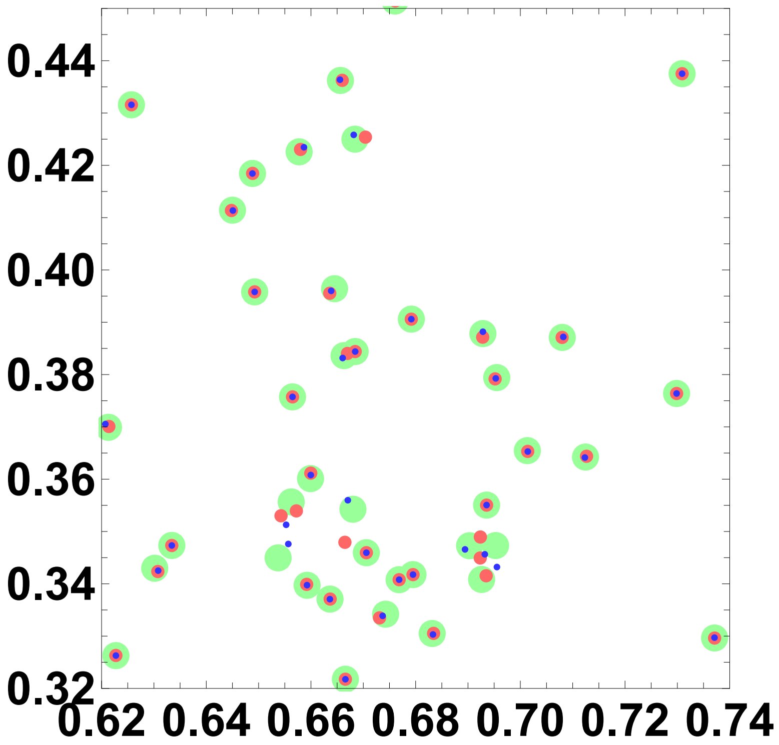
In[•]:=

```
xplotrange = {0.62, 0.74};
yplotrange = {0.32, 0.45};

size1 = 19;
size2 = 12;
size3 = 8;
dgreen = 0.045;
dred = 0.022;
dblue = 0.011;

{plot3, plot4} = plotting3[Q1, P1, Q2, P2, Q3, P3,
   xplotrange, yplotrange, dgreen, dred, dblue, size1, size2, size3];
Show[plot3, ImageSize → 400]
Show[plot4, ImageSize → 400]
```

Out[ ]=


1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

Out[ ]=


0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.62
0.64
0.66
0.68
0.70
0.72
0.74

# Configuration B: Swapping two blocks

```
s = 13;
int = s - 4;
m = RandomInteger[{0, int}, {19, 16}];
```

Here, we just switch two blocks between two matrices, identical on the outside of these blocks.

```
pos1 = {3, 2};
pos2 = {12, 9};
tout = 6;
nout = 4;

{o1, o2} = swapping1block[int, m, pos1, pos2, tout, nout] ;

o1C = coloring1block[o1, pos1, tout, nout, Green];
o1C = coloring1block[o1C, pos2, tout, nout, Red];

o2C = coloring1block[o2, pos1, tout, nout, Red];
o2C = coloring1block[o2C, pos2, tout, nout, Green];

o1C // MatrixForm
o2C // MatrixForm
```

```
6 6 3 0 8 5 7 8 2 2 9 4 5 1 3 0
4 9 3 8 8 0 4 8 0 9 4 2 3 3 5 5
5 2 2 0 2 3 9 9 9 2 3 8 2 9 4 6
1 5 3 5 4 4 4 3 6 0 7 4 1 9 8 8
5 2 0 4 8 4 8 5 7 4 9 2 7 4 1 0
8 9 9 2 5 4 4 7 2 2 3 8 0 4 6 5
3 2 8 2 0 3 7 9 6 5 8 3 8 2 2 1
5 1 6 9 7 4 1 4 2 3 5 3 9 3 2 1
9 5 6 8 3 1 0 3 6 6 4 8 9 9 4 7
2 5 3 8 8 7 7 2 5 4 5 4 6 1 0 0
2 3 3 8 2 6 5 3 0 6 3 1 5 2 5 4
1 1 6 9 8 4 2 5 4 1 7 4 1 4 5 2
1 3 5 4 1 1 6 8 9 0 3 4 0 4 2 3
3 6 2 2 4 1 2 6 4 7 4 8 1 5 0 1
2 3 9 3 8 4 6 4 6 0 5 0 1 4 2 0
5 8 8 6 6 7 9 2 6 9 9 8 1 2 8 7
5 5 7 6 6 3 5 6 0 2 3 6 0 5 9 2
4 9 2 6 3 4 2 3 7 9 4 0 1 0 1 8
8 6 2 0 7 8 1 7 5 7 3 7 6 1 2 3
```

$$\begin{pmatrix}
6 & 6 & 3 & 0 & 8 & 5 & 7 & 8 & 2 & 2 & 9 & 4 & 5 & 1 & 3 & 0 \\
4 & 9 & 3 & 8 & 8 & 0 & 4 & 8 & 0 & 9 & 4 & 2 & 3 & 3 & 5 & 5 \\
5 & \mathbf{4} & \mathbf{1} & \mathbf{7} & \mathbf{4} & 3 & 9 & 9 & 9 & 2 & 3 & 8 & 2 & 9 & 4 & 6 \\
1 & \mathbf{9} & \mathbf{0} & \mathbf{3} & \mathbf{4} & 4 & 4 & 3 & 6 & 0 & 7 & 4 & 1 & 9 & 8 & 8 \\
5 & \mathbf{4} & \mathbf{7} & \mathbf{4} & \mathbf{8} & 4 & 8 & 5 & 7 & 4 & 9 & 2 & 7 & 4 & 1 & 0 \\
8 & \mathbf{6} & \mathbf{0} & \mathbf{5} & \mathbf{0} & 4 & 4 & 7 & 2 & 2 & 3 & 8 & 0 & 4 & 6 & 5 \\
3 & \mathbf{6} & \mathbf{9} & \mathbf{9} & \mathbf{8} & 3 & 7 & 9 & 6 & 5 & 8 & 3 & 8 & 2 & 2 & 1 \\
5 & \mathbf{0} & \mathbf{2} & \mathbf{3} & \mathbf{6} & 4 & 1 & 4 & 2 & 3 & 5 & 3 & 9 & 3 & 2 & 1 \\
9 & 5 & 6 & 8 & 3 & 1 & 0 & 3 & 6 & 6 & 4 & 8 & 9 & 9 & 4 & 7 \\
2 & 5 & 3 & 8 & 8 & 7 & 7 & 2 & 5 & 4 & 5 & 4 & 6 & 1 & 0 & 0 \\
2 & 3 & 3 & 8 & 2 & 6 & 5 & 3 & 0 & 6 & 3 & 1 & 5 & 2 & 5 & 4 \\
1 & 1 & 6 & 9 & 8 & 4 & 2 & 5 & \mathbf{2} & \mathbf{2} & \mathbf{0} & \mathbf{2} & 1 & 4 & 5 & 2 \\
1 & 3 & 5 & 4 & 1 & 1 & 6 & 8 & \mathbf{5} & \mathbf{3} & \mathbf{5} & \mathbf{4} & 0 & 4 & 2 & 3 \\
3 & 6 & 2 & 2 & 4 & 1 & 2 & 6 & \mathbf{2} & \mathbf{0} & \mathbf{4} & \mathbf{8} & 1 & 5 & 0 & 1 \\
2 & 3 & 9 & 3 & 8 & 4 & 6 & 4 & \mathbf{9} & \mathbf{9} & \mathbf{2} & \mathbf{5} & 1 & 4 & 2 & 0 \\
5 & 8 & 8 & 6 & 6 & 7 & 9 & 2 & \mathbf{2} & \mathbf{8} & \mathbf{2} & \mathbf{0} & 1 & 2 & 8 & 7 \\
5 & 5 & 7 & 6 & 6 & 3 & 5 & 6 & \mathbf{1} & \mathbf{6} & \mathbf{9} & \mathbf{7} & 0 & 5 & 9 & 2 \\
4 & 9 & 2 & 6 & 3 & 4 & 2 & 3 & 7 & 9 & 4 & 0 & 1 & 0 & 1 & 8 \\
8 & 6 & 2 & 0 & 7 & 8 & 1 & 7 & 5 & 7 & 3 & 7 & 6 & 1 & 2 & 3
\end{pmatrix}$$

### Evaluating and Plotting;

```
{Q1, P1} = Orbits[s, o1];
{Q2, P2} = Orbits[s, o2];
```

In[∘]:=
```
(*xplotrange = {0.55,0.61};
yplotrange = {0.16,0.21};

sizeg1 = 13;
dgreen = 0.04;
dred = 0.015;

{plot3,plot4} = plotting2[Q1,P1,Q2,P2,xplotrange,yplotrange,dgreen,dred,sizeg1];
plot3
 plot4*)
```

# Configuration C: Swapping 2 diamond-shaped cores between 2 sequences with shared diamond-shaped surrounding

```
s = 7;
int = s - 4;
m = RandomInteger[{0, int}, {30, 29}];
```

Here, we just switch two diamond-shaped blocks between two sequences, with identical bordering on the outside of these blocks. From the m matrix defined above, we generate two matrices m1 and m2, identical, except to small diamond-shaped submatrices B and C that are interchanged between m1 and m2. The blocks B (green) and C (red) on both matrices are always surrounded by a bigger diamond-shaped “frame” A (blue).

```
pos1 = {2, 10};
pos2 = {15, 18};
dout = 8;
din = 2;

{m1, m2} = swapping2diamonds[int, m, dout, din, pos1, pos2] ;

m1C = coloringdiamond[m1, dout, din, pos1, Blue, Red];
m1C = coloringdiamond[m1C, dout, din, pos2, Blue, Green];

m2C = coloringdiamond[m2, dout, din, pos1, Blue, Green];
m2C = coloringdiamond[m2C, dout, din, pos2, Blue, Red];

m1C // MatrixForm
m2C // MatrixForm
```

```
1 2 2 0 2 3 3 3 2 2 3 1 0 1 0 2 3 3 0 0 0 0 0 3 0 0 1 1 3
1 0 3 0 3 3 1 0 2 0 1 2 1 1 0 0 0 0 1 1 0 2 1 1 3 1 2 1 0
2 3 0 3 0 3 2 0 3 2 3 2 0 2 1 2 1 3 2 2 0 1 1 2 3 2 0 3 3
2 3 2 1 0 0 2 2 3 0 3 2 2 2 1 2 3 2 3 3 2 1 1 2 0 3 0 2 2
2 1 3 1 3 2 2 2 3 2 0 2 0 1 0 0 1 3 2 3 3 1 3 0 3 1 2 3 0
3 2 2 0 2 0 0 0 3 2 0 0 2 1 2 2 2 3 0 3 2 3 3 3 1 1 3 0 1
0 2 2 3 3 0 3 1 3 2 1 0 2 3 2 0 0 1 0 3 0 3 2 0 3 3 2 3 2
0 3 0 3 2 1 2 3 0 3 1 3 1 0 3 3 2 1 1 2 3 1 3 0 1 0 0 0 0
1 1 2 2 1 2 1 3 3 3 0 0 3 2 0 2 0 1 2 1 1 0 1 2 1 1 2 0 2
1 3 2 0 1 0 1 3 1 1 3 2 3 3 0 0 1 0 0 0 0 3 0 1 3 1 2 2 1
0 0 0 1 0 3 1 1 0 0 3 3 1 2 1 1 0 0 2 3 2 3 3 3 2 3 3 3 2
0 3 3 2 0 0 2 2 2 2 0 1 1 3 1 3 0 1 0 2 2 3 2 2 1 3 2 2 0
0 1 3 0 1 0 3 1 0 2 2 1 1 0 1 0 0 0 1 0 0 2 3 1 1 1 2 0 3
2 0 3 0 1 2 3 2 0 2 3 3 3 0 3 1 2 3 3 3 1 1 3 1 0 0 0 3 2
3 3 2 1 3 2 1 2 0 0 1 2 2 0 1 1 2 0 3 3 1 1 2 0 2 2 3 2 3
1 1 1 2 0 1 1 3 2 1 1 2 3 0 2 1 3 2 3 1 2 2 3 0 1 3 3 1 0
3 0 3 3 2 0 0 0 0 2 1 3 0 0 3 2 3 0 3 2 3 3 1 2 3 1 0 3 0
1 1 0 1 3 2 2 1 0 2 0 0 0 3 2 2 3 2 0 2 0 3 0 3 2 1 0 3 1
1 0 2 2 1 2 2 1 1 1 3 0 3 0 0 0 3 2 0 0 2 1 0 3 3 1 0 2 2
0 0 1 0 1 0 0 1 2 3 2 2 3 0 3 1 3 2 1 0 2 3 2 1 3 1 2 2 2
3 0 2 0 3 3 2 1 1 0 1 3 2 1 2 3 0 1 1 3 1 0 3 3 2 3 1 0 3
0 2 2 0 2 2 3 0 0 3 2 2 1 2 1 3 2 2 0 0 3 2 0 2 0 3 3 0 0
0 0 0 3 0 1 1 0 2 3 1 0 1 0 1 3 1 3 3 2 3 3 0 0 2 2 2 2 1
3 2 1 1 3 3 2 0 0 0 2 1 0 3 1 1 0 0 3 3 1 2 1 1 2 3 1 3 1
1 1 0 0 2 1 3 2 3 3 0 0 1 0 2 2 2 2 0 1 1 3 2 2 1 2 1 1 3
0 2 0 0 1 0 3 0 0 2 2 3 2 3 3 1 0 2 2 1 1 2 3 1 0 2 2 3 0
1 1 1 0 2 3 1 0 3 1 2 1 2 3 2 2 0 2 3 3 1 0 0 1 0 3 0 1 2
2 2 0 2 1 2 1 3 0 2 3 0 2 3 3 2 0 0 1 2 1 0 2 3 2 1 3 2 2
3 0 0 2 2 1 0 3 1 2 1 1 2 2 1 0 1 1 3 0 0 1 3 0 0 0 0 3 1
2 1 3 0 1 3 2 0 3 1 1 3 2 3 0 2 0 0 0 3 1 3 1 2 3 2 2 1 2
```

```
1 2 2 0 2 3 3 3 2 2 3 1 0 1 0 2 3 3 0 0 0 0 0 3 0 0 1 1 3
1 0 3 0 3 3 1 0 2 0 1 2 1 1 0 0 0 0 1 1 0 2 1 1 3 1 2 1 0
2 3 0 3 0 3 2 0 3 2 3 2 0 2 1 2 1 3 2 2 0 1 1 2 3 2 0 3 3
2 3 2 1 0 0 2 2 3 0 3 2 2 2 1 2 3 2 3 3 2 1 1 2 0 3 0 2 2
2 1 3 1 3 2 2 2 3 2 0 2 0 1 0 0 1 3 2 3 3 1 3 0 3 1 2 3 0
3 2 2 0 2 0 0 0 3 2 0 0 2 1 2 2 2 3 0 3 2 3 3 3 1 1 3 0 1
0 2 2 3 3 0 3 1 3 2 1 0 2 3 2 0 0 1 0 3 0 3 2 0 3 3 2 3 2
0 3 0 3 2 1 2 3 0 1 1 3 1 0 3 3 2 1 1 2 3 1 3 0 1 0 0 0 0
1 1 2 2 1 2 1 3 2 2 0 0 3 2 0 2 0 1 2 1 1 0 1 2 1 1 2 0 2
1 3 2 0 1 0 1 3 1 3 3 2 3 3 0 0 1 0 0 0 0 3 0 1 3 1 2 2 1
0 0 0 1 0 3 1 1 0 0 3 3 1 2 1 1 0 0 2 3 2 3 3 3 2 3 3 3 2
0 3 3 2 0 0 2 2 2 2 0 1 1 3 1 3 0 1 0 2 2 3 2 2 1 3 2 2 0
0 1 3 0 1 0 3 1 0 2 2 1 1 0 1 0 0 0 1 0 0 2 3 1 1 1 2 0 3
2 0 3 0 1 2 3 2 0 2 3 3 3 0 3 1 2 3 3 3 1 1 3 1 0 0 0 3 2
3 3 2 1 3 2 1 2 0 0 1 2 2 0 1 1 2 0 3 3 1 1 2 0 2 2 3 2 3
1 1 1 2 0 1 1 3 2 1 1 2 3 0 2 1 3 2 3 1 2 2 3 0 1 3 3 1 0
3 0 3 3 2 0 0 0 0 2 1 3 0 0 3 2 3 0 3 2 3 3 1 2 3 1 0 3 0
1 1 0 1 3 2 2 1 0 2 0 0 0 3 2 2 3 2 0 2 0 3 0 3 2 1 0 3 1
1 0 2 2 1 2 2 1 1 1 3 0 3 0 0 0 3 2 0 0 2 1 0 3 3 1 0 2 2
0 0 1 0 1 0 0 1 2 3 2 2 3 0 3 1 3 2 1 0 2 3 2 1 3 1 2 2 2
3 0 2 0 3 3 2 1 1 0 1 3 2 1 2 3 0 3 1 3 1 0 3 3 2 3 1 0 3
0 2 2 0 2 2 3 0 0 3 2 2 1 2 1 3 3 3 0 0 3 2 0 2 0 3 3 0 0
0 0 0 3 0 1 1 0 2 3 1 0 1 0 1 3 1 1 3 2 3 3 0 0 2 2 2 2 1
3 2 1 1 3 3 2 0 0 0 2 1 0 3 1 1 0 0 3 3 1 2 1 1 2 3 1 3 1
1 1 0 0 2 1 3 2 3 3 0 0 1 0 2 2 2 2 0 1 1 3 2 2 1 2 1 1 3
0 2 0 0 1 0 3 0 0 2 2 3 2 3 3 1 0 2 2 1 1 2 3 1 0 2 2 3 0
1 1 1 0 2 3 1 0 3 1 2 1 2 3 2 2 0 2 3 3 1 0 0 1 0 3 0 1 2
2 2 0 2 1 2 1 3 0 2 3 0 2 3 3 2 0 0 1 2 1 0 2 3 2 1 3 2 2
3 0 0 2 2 1 0 3 1 2 1 1 2 2 1 0 1 1 3 0 0 1 3 0 0 0 0 3 1
2 1 3 0 1 3 2 0 3 1 1 3 2 3 0 2 0 0 0 3 1 3 1 2 3 2 2 1 2
```

## Evaluating and Plotting;

```
{Q1, P1} = Orbits[s, m1];
{Q2, P2} = Orbits[s, m2];
```

In[∘]:=
```
(*xplotrange = {0.3,0.41};
yplotrange = {0.08,0.20};

size1 = 17;
size2 = 10;
dgreen = 0.04;
dred = 0.015;

{plot3,plot4} =
 plotting2[Q1,P1,Q2,P2,xplotrange,yplotrange,dgreen,dred,size1,size2];
plot3
 plot4*)
```

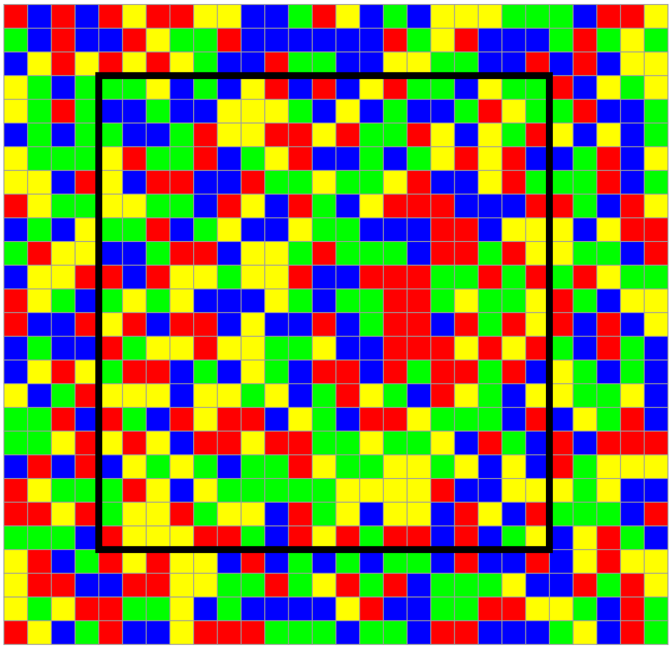
# Configuration D: Swapping 2 cores with shared surrounding and symbol coloring

```
In[•]:= s = 7;
        int = s - 4;
        m1 = RandomInteger[{0, int}, {27, 28}];
        m2 = RandomInteger[{0, int}, {27, 28}];
        {T, Np} = Dimensions[m1];
```

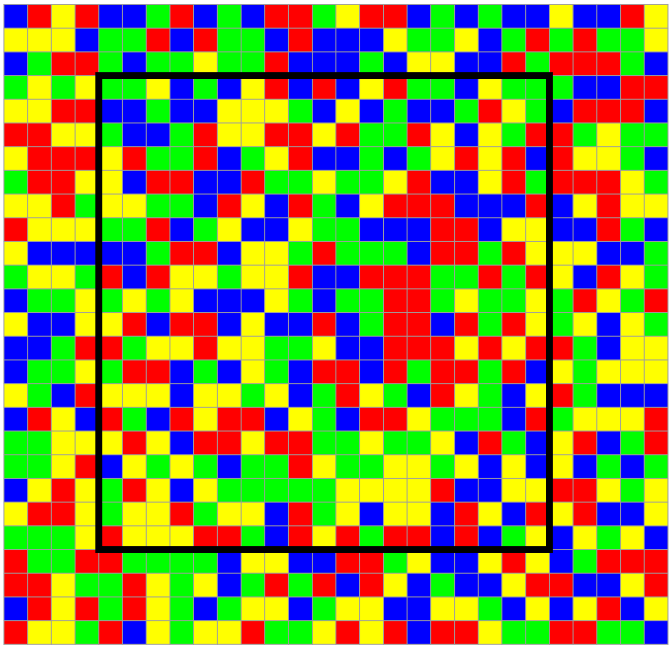
Here, we have a common core, but the the surrounding of the matrix is different.

```
In[•]:= pos = {4, 5};
        tout = 20;
        nout = 19;
        tfac = 0;
        nfac = 0;
        posbis = {tfac, nfac};

        {o1, o2} = diffoutside[int, m1, m2, pos, tout, nout];

        posbig1 = {pos[[2]] - 1, T - pos[[1]] - tout + 1};
        posbig2 = {pos[[2]] + nout - 1, T - pos[[1]] + 1};
        possmall1 = {pos[[2]] + nfac - 1, T - pos[[1]] - tout + tfac + 1};
        possmall2 = {pos[[2]] + nout - nfac - 1, T - pos[[1]] - tfac + 1};

        minb = 1;
        maxb = 3;
        cs = "DeepSeaColors";
        colorscheme = Table[ColorData[{cs, {minb, maxb}}][i], {i, 0, int}] // Reverse

        G3 = Show[replacingsymbolswithsquares[o1, {Green, Yellow, Blue, Red}],
          drawingsquares[posbig1, posbig2, 0.01]]
        G4 = Show[replacingsymbolswithsquares[o2, {Green, Yellow, Blue, Red}],
          drawingsquares[posbig1, posbig2, 0.01]]
        G5 = Show[replacingsymbolswithsquares[Abs[o2 - o1], colorscheme],
          drawingsquares[posbig1, posbig2, 0.01, Black]]

Out[•]= {□, 🟦, ■, ■}
```

Out[●]=



Out[●]=



Out[ ]=