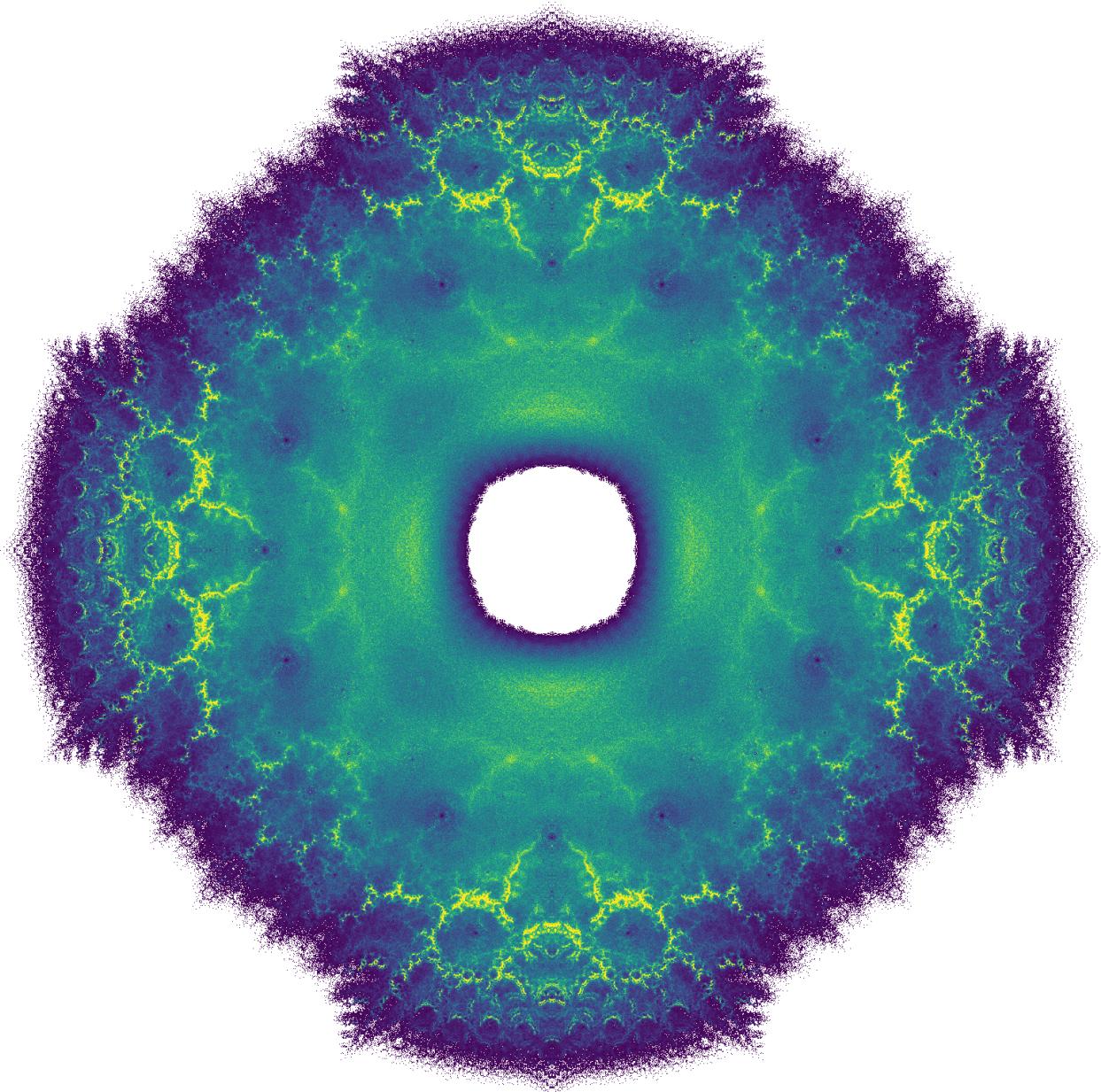


Bohemian Matrices
2021 Calendar



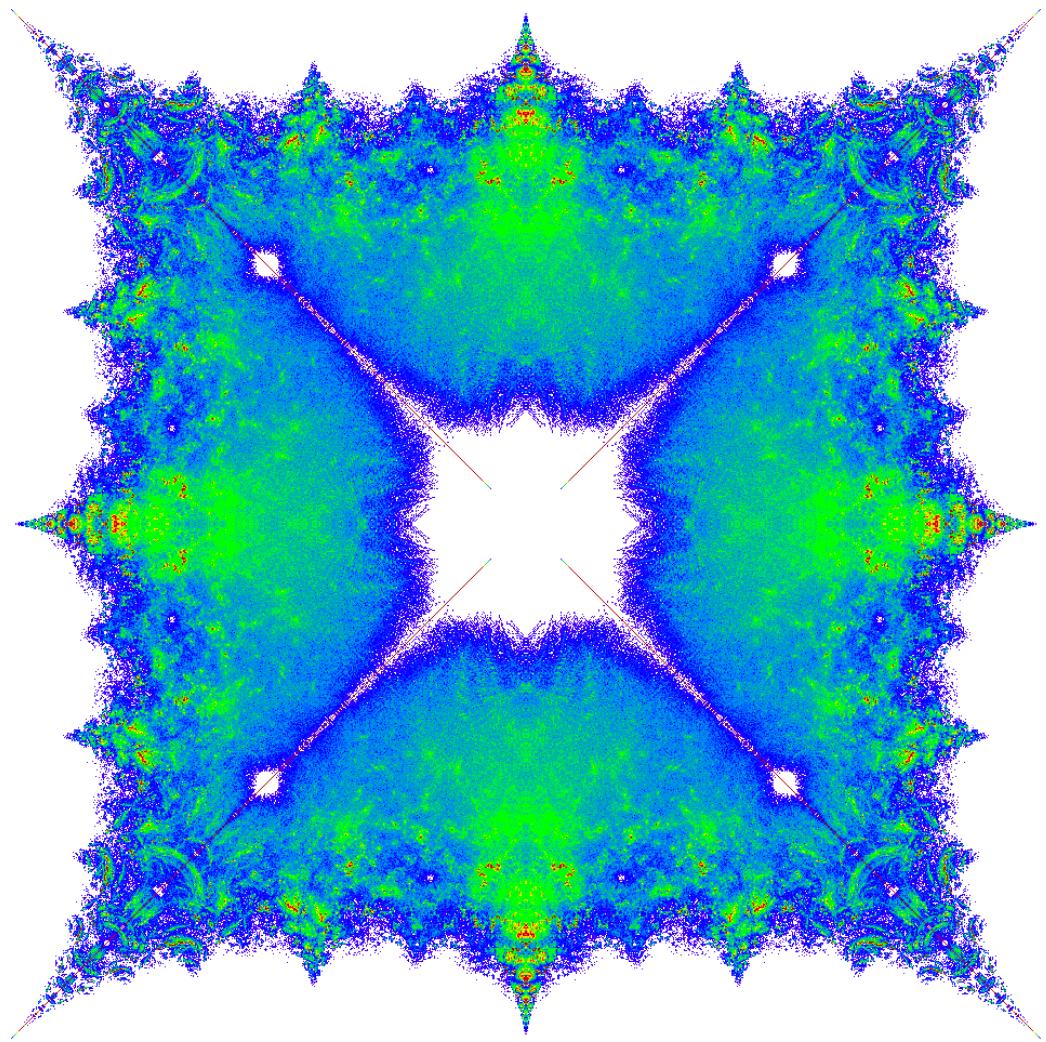
Skew-symmetric tridiagonal,
 $m = 10$, $P = (1, \alpha, \alpha^3, \bar{\alpha}, \bar{\alpha}^3, i)$ where $\alpha = \exp(\pi i/8)$.
 Image ©(2020) Robert M. Corless and Steven E. Thornton

M	T	W	T	F	S	S
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

December						
M	T	W	T	F	S	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

January 2021



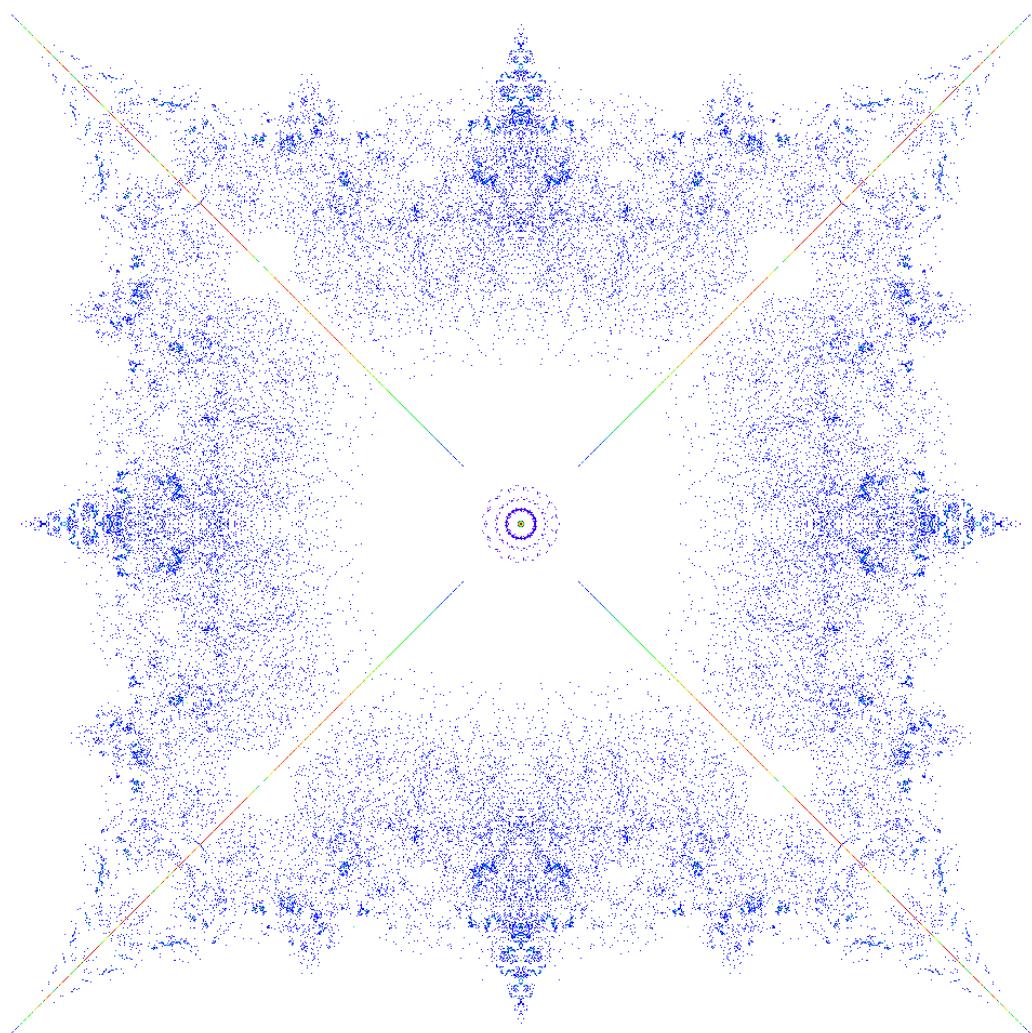
Skew-symmetric tridiagonal,
 $m = 22, P = 1 \pm i$.
 Image ©(2020) Robert M. Corless

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

January						
M	T	W	T	F	S	S
					1	2
					3	
				4	5	6
				7	8	9
				10	11	12
				13	14	15
				16	17	18
				19	20	21
				22	23	24
				25	26	27
				28	29	30
				31		

March						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2021



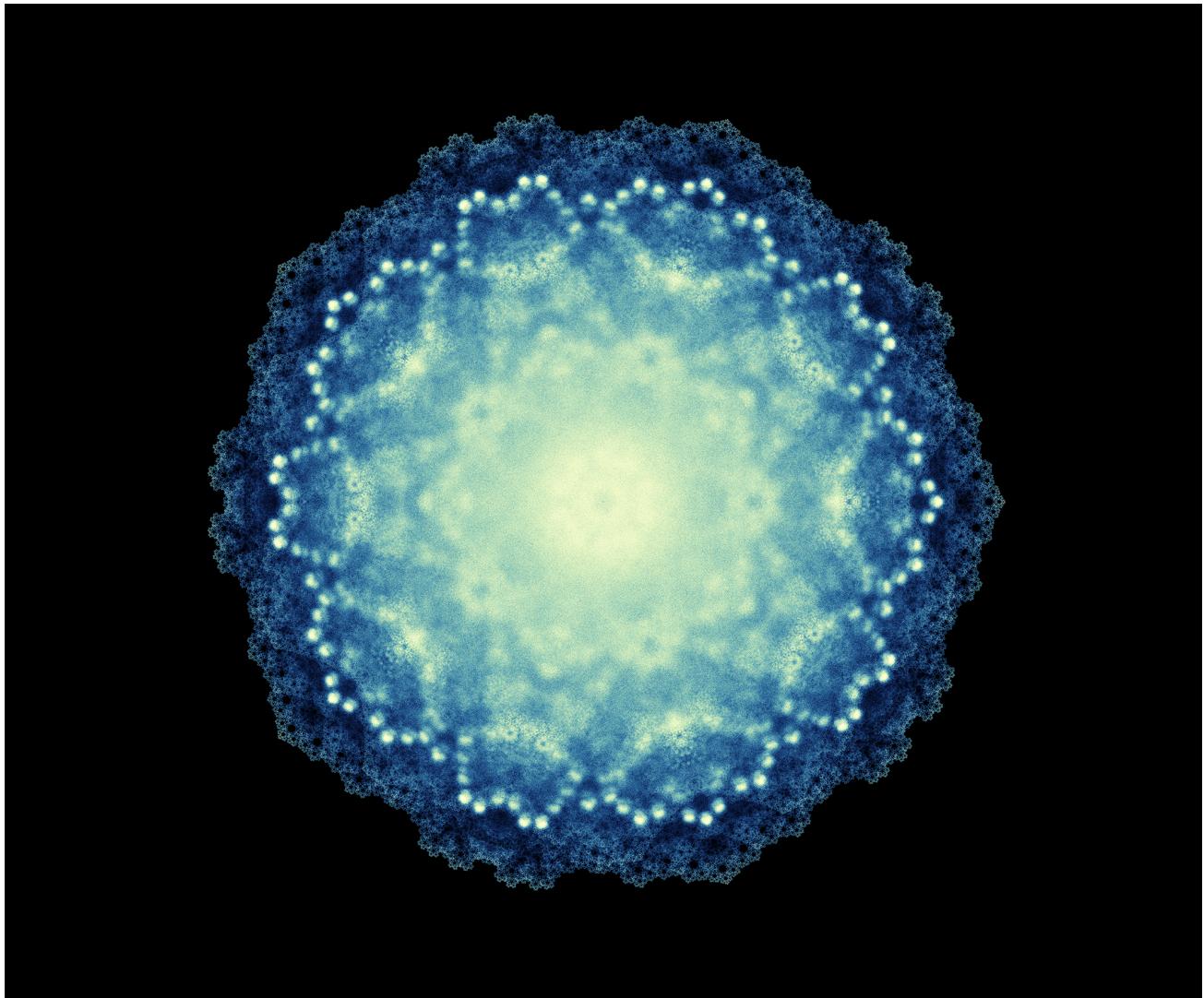
Skew-symmetric tridiagonal with visible rounding errors
 $m = 15, P = 1 \pm i$.
 Image ©(2020) Robert M. Corless

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

April						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

March 2021



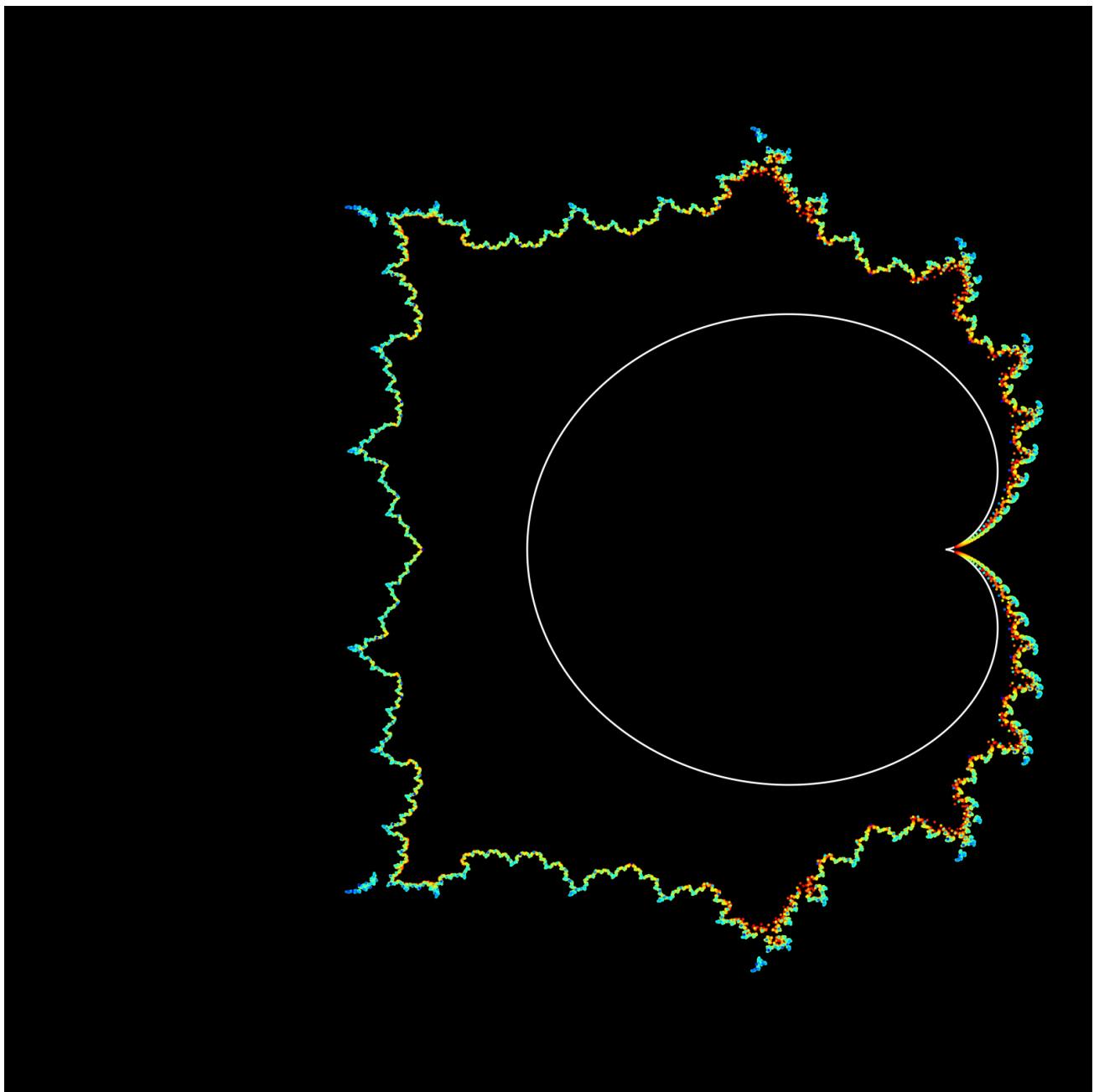
Upper Hessenberg Toeplitz matrices with diagonal entries fixed at 0, subdiagonal entries fixed at 1, and the population is all complex fifth roots of unity. Dimension $m = 13$, sample of 10 million matrices.

Image ©(2020) Robert M. Corless and Steven E. Thornton

March						
M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May						
M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
					31	

April 2021



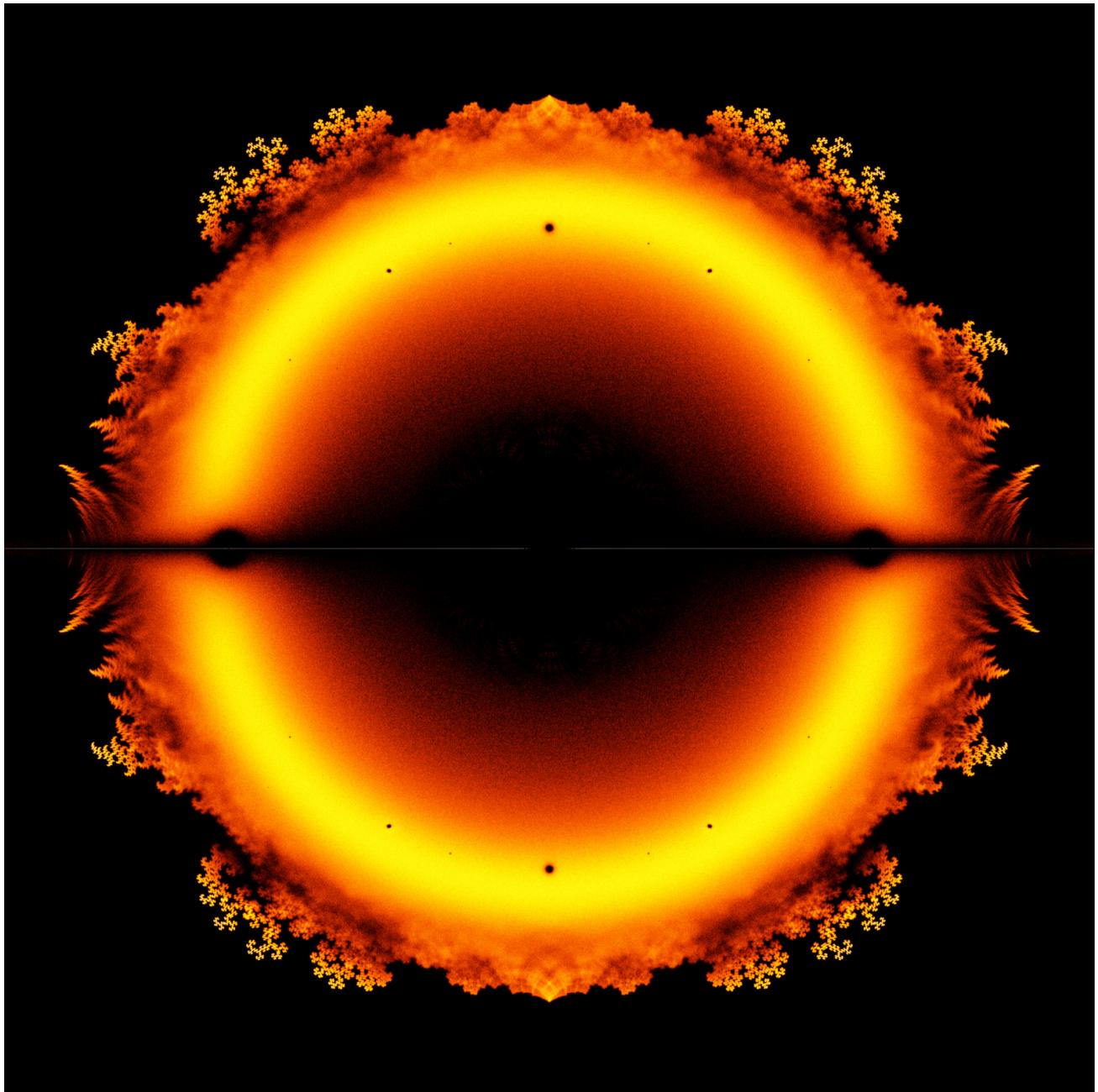
Complex roots of the Fibonacci-Mandelbrot polynomials defined by $q_0 = 0$, $q_1 = 1$, $q_{n+1} = zq_nq_{n-1} + 1$ for n from 4 through 30.
Image ©(2015) Eunice Y. S. Chan and Robert M. Corless

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April						
M	T	W	T	F	S	S
					1	2
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

June						
M	T	W	T	F	S	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May 2021



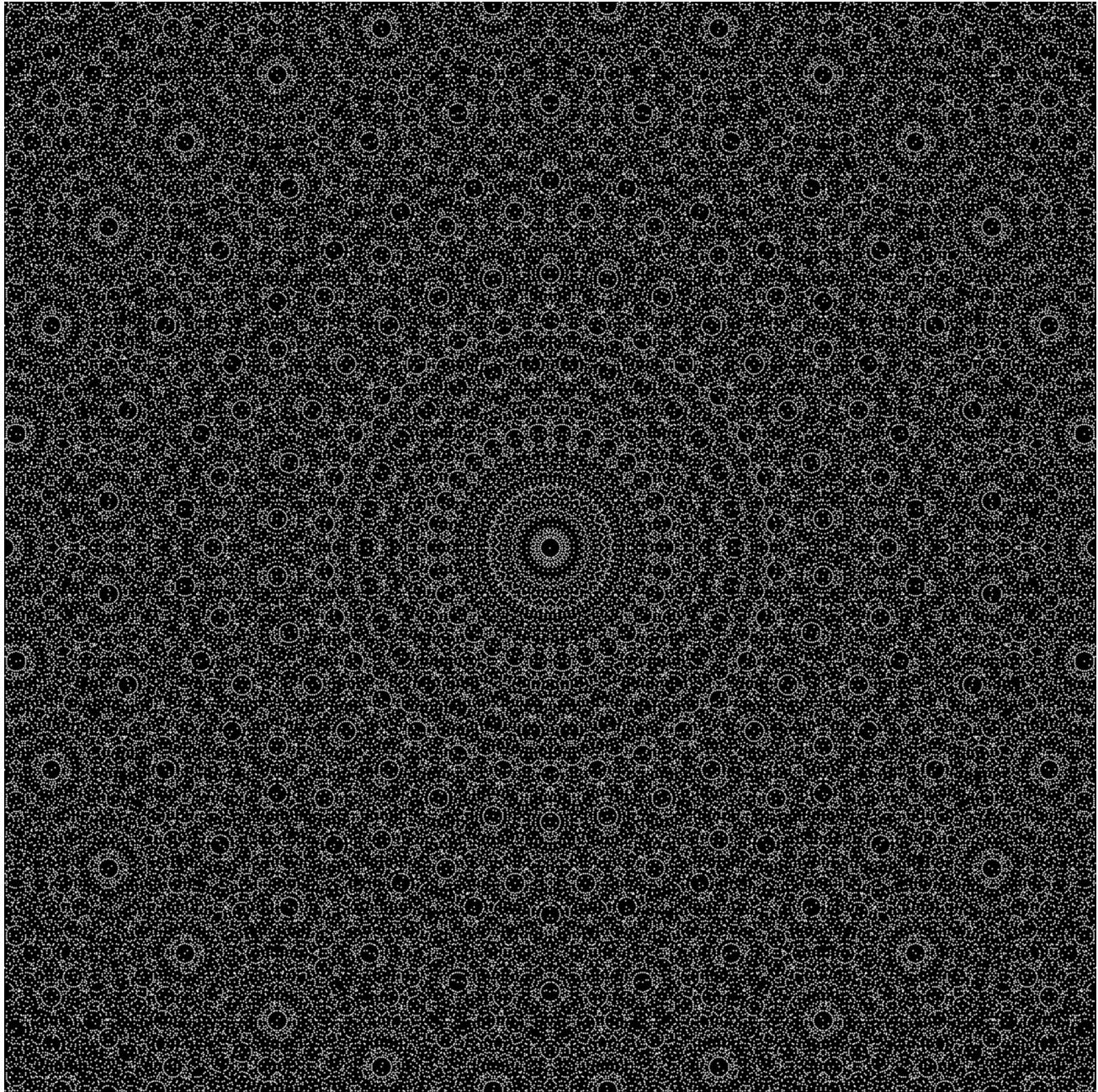
Doubly companion matrices with population ± 1 . Dimension $m = 19$, sample of 10 million matrices.
Image ©(2018) Robert M. Corless and Steven E. Thornton

M	T	W	T	F	S	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
M	T	W	T	F	S	S
					1	2
					3	4
					5	6
					7	8
					9	
					10	11
					12	13
					14	15
					16	
					17	18
					19	20
					21	22
					23	24
					25	26
					27	28
					29	30
					31	

July						
M	T	W	T	F	S	S
					1	2
					3	4
					5	6
					7	8
					9	10
					11	
					12	13
					14	15
					16	17
					18	
					19	20
					21	22
					23	24
					25	
					26	27
					28	29
					30	31

June 2021



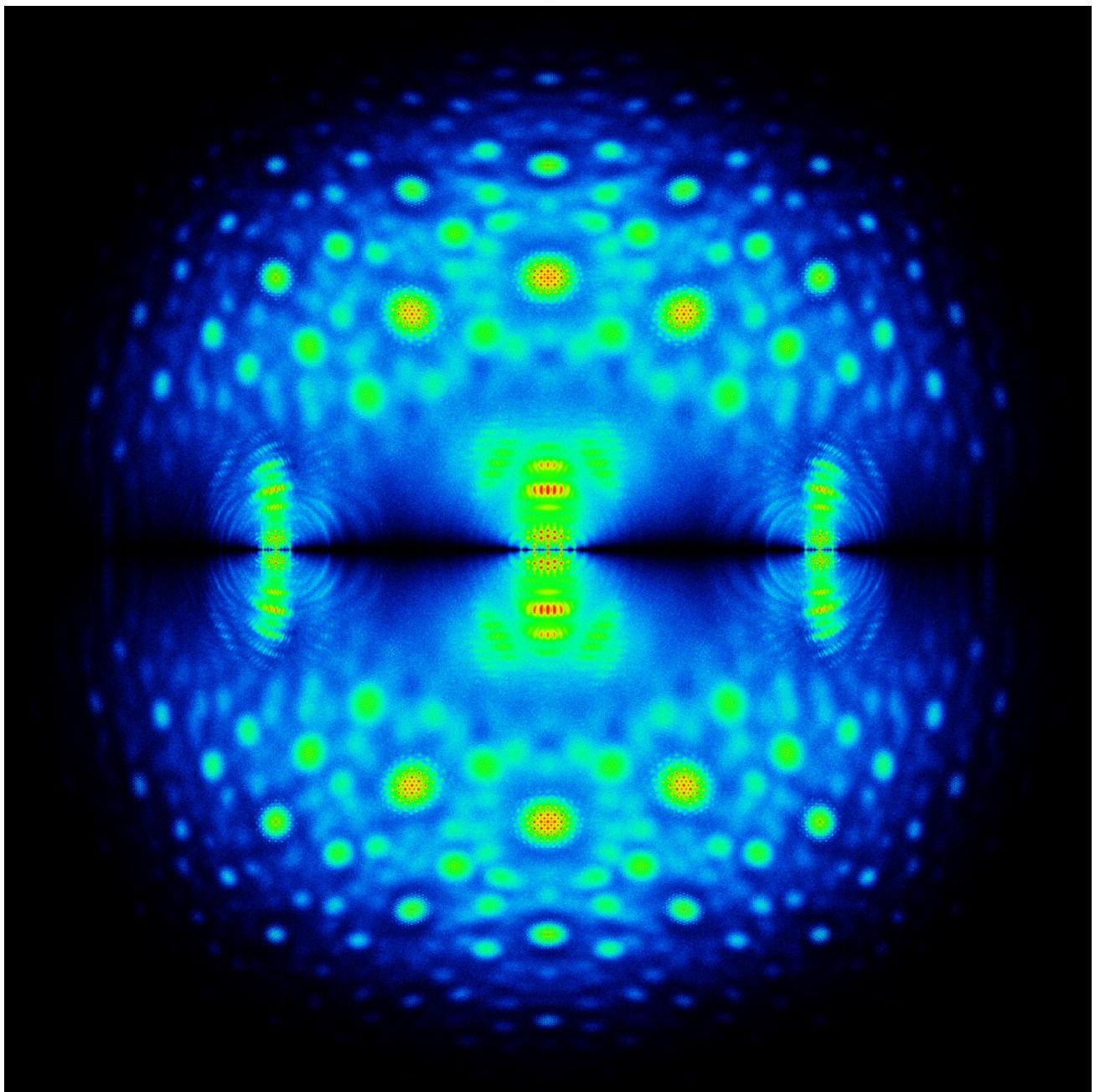
Circulant matrices with population $(-1, 0, 1)$. Dimension $m = 15$, sample of 5 million matrices.
 Image ©(2015) Robert M. Corless and Jonathan Briño-Tarasoff

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June						
M	T	W	T	F	S	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

August						
M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

July 2021



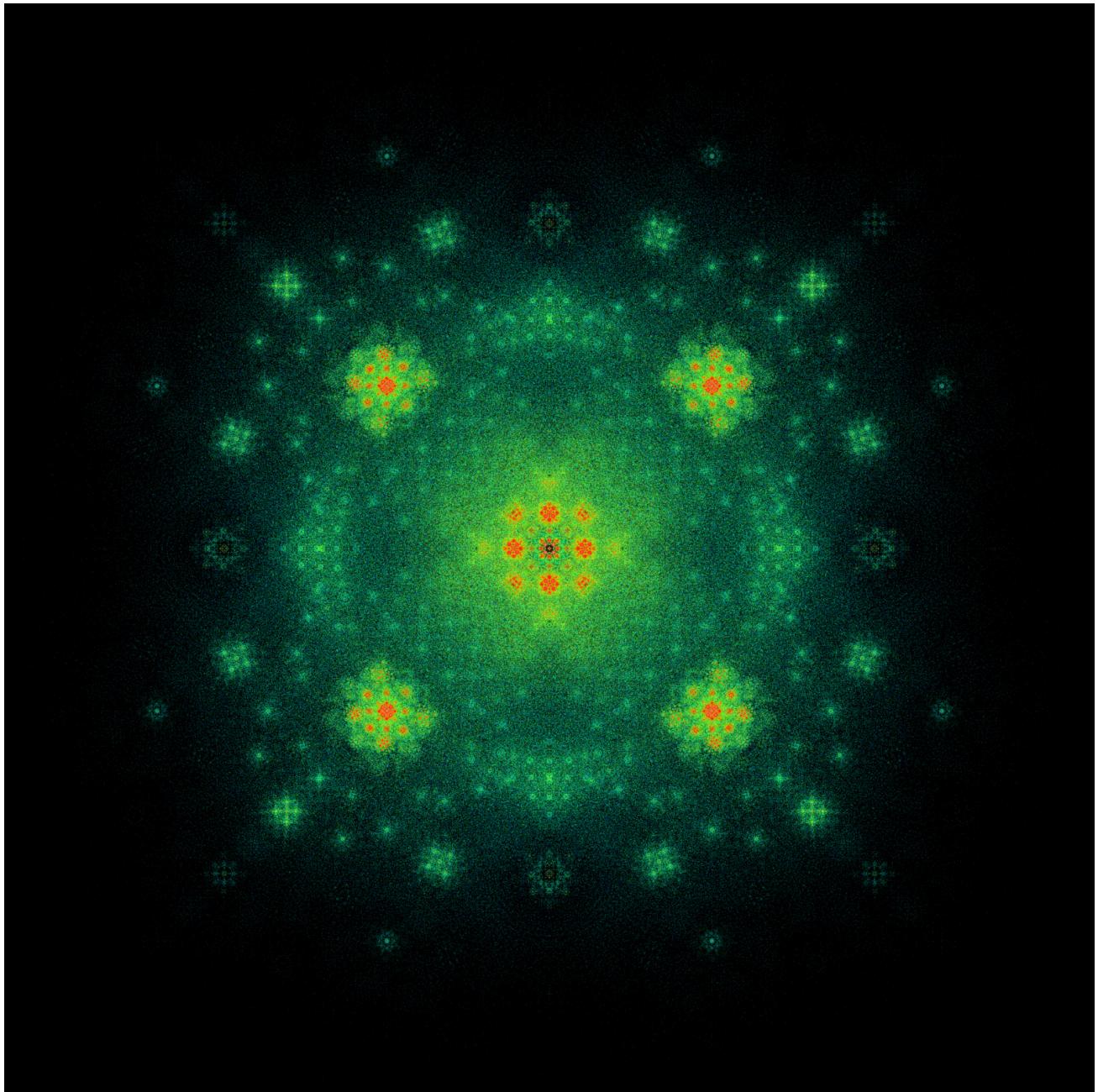
Unstructured matrices with population $(-20, -1, 0, 1, 20)$. Dimension $m = 5$, sample of 73 million matrices.
Image ©(2017) Robert M. Corless and Steven E. Thornton

M	T	W	T	F	S	S	
2	3	4	5	6	7	8	1
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	
30	31						

July						
M	T	W	T	F	S	S
1	2	3	4			
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September						
M	T	W	T	F	S	S
1	2	3	4	5		
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

August 2021



Checkerboard 6 from www.bohemianmatrices.com. Ten million 6 by 6 matrices sampled. Population has nine entries.
Image ©(2016) Steven E. Thornton

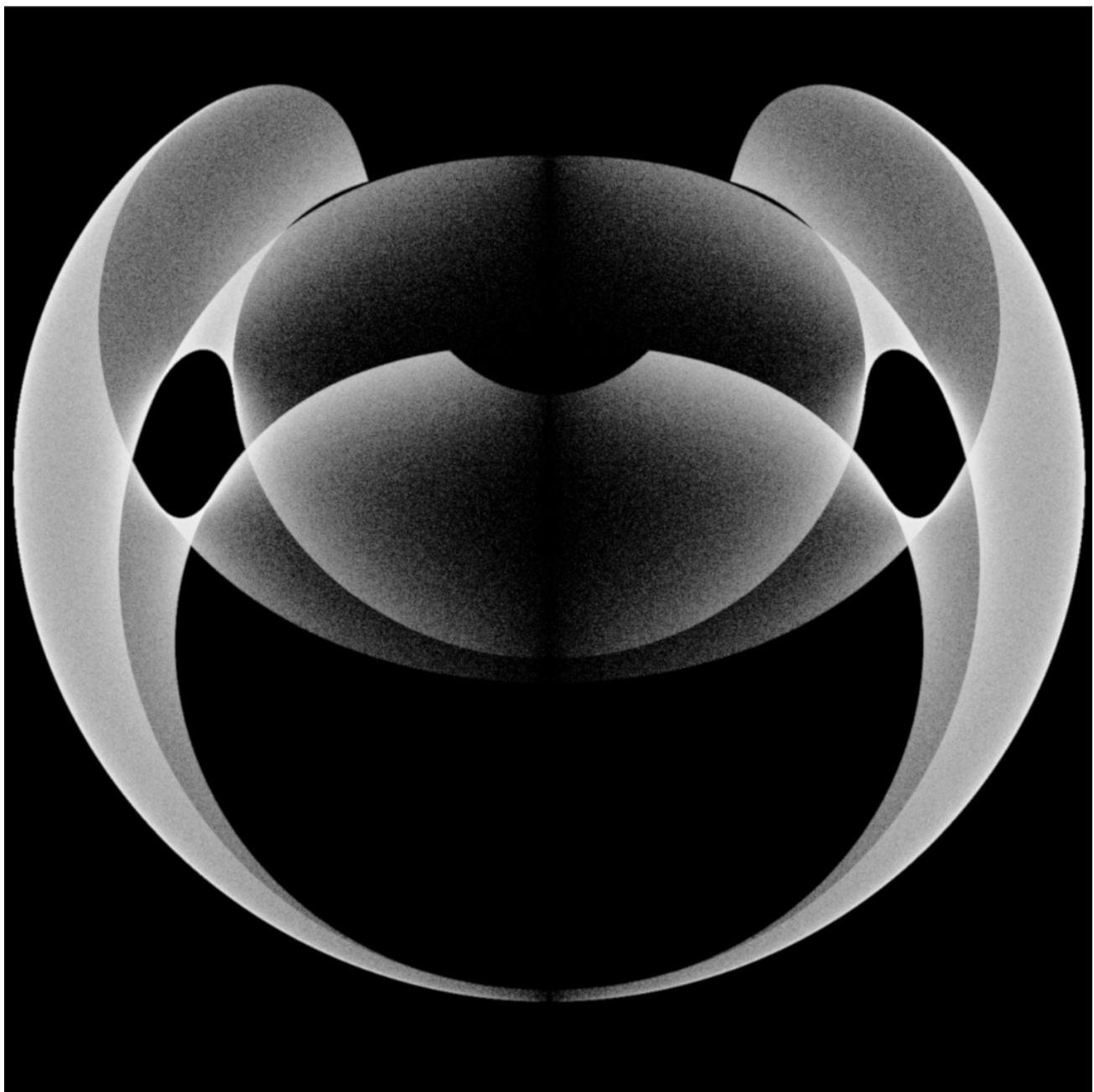
September 2021						
M	T	W	T	F	S	S
			1	2	3	4
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

August

M	T	W	T	F	S	S
						1
			2	3	4	5
			9	10	11	12
			13	14	15	
			16	17	18	19
			20	21	22	
			23	24	25	26
			27	28	29	29
			30	31		

October

M	T	W	T	F	S	S
						1
			2	3		
			4	5	6	7
			8	9	10	
			11	12	13	14
			15	16	17	
			18	19	20	21
			22	23	24	
			25	26	27	28
			29	30	31	



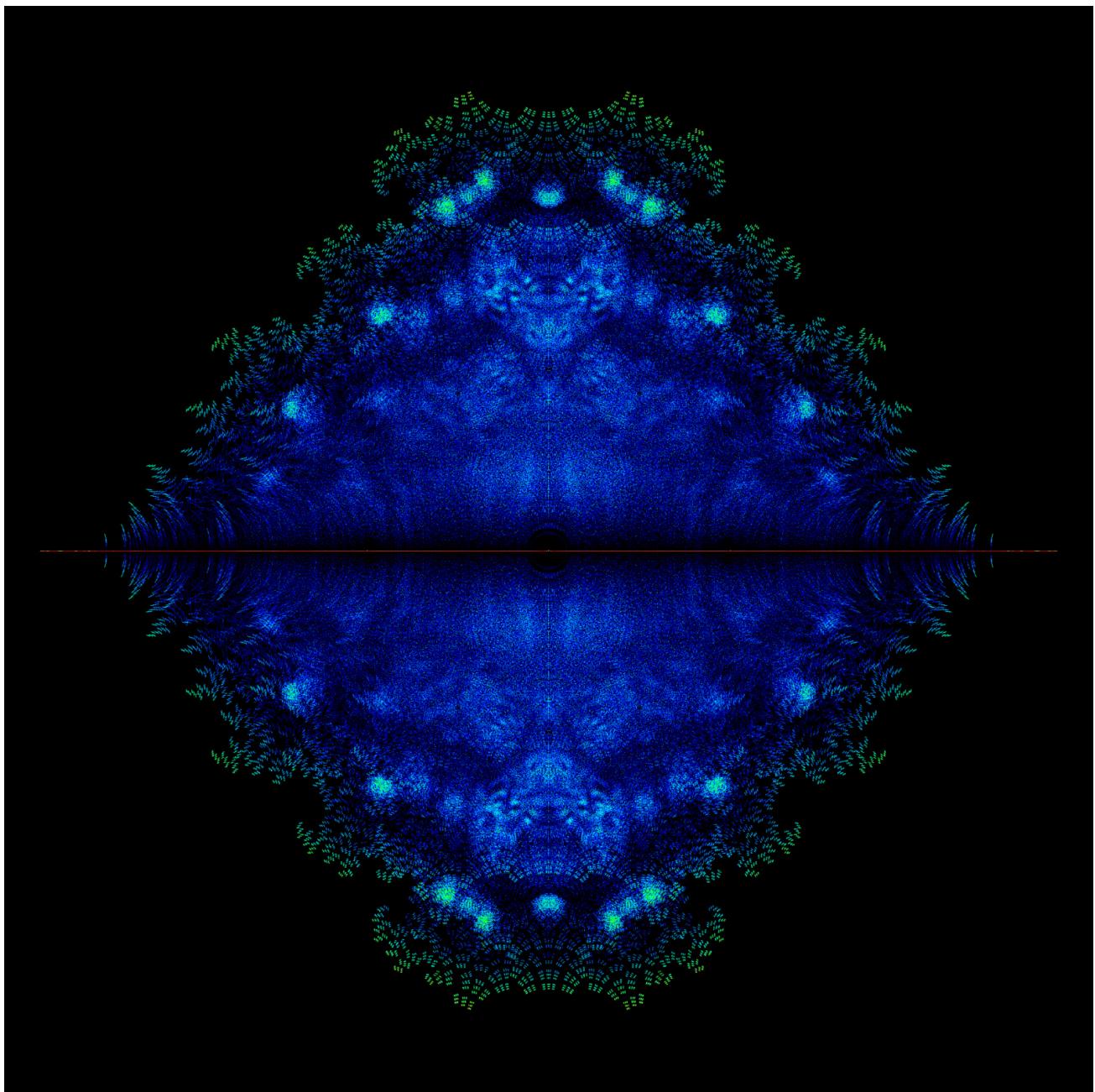
Eigenfish 3 from www.bohemianmatrices.com, rotated 90 degrees.
Image ©(2020) Robert M. Corless and Steven E. Thornton

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September						
M	T	W	T	F	S	S
					1	2
					3	4
					5	6
					7	8
					9	10
					11	12
					13	14
					15	16
					17	18
					19	20
					21	22
					23	24
					25	26
					27	28
					29	30

November						
M	T	W	T	F	S	S
					1	2
					3	4
					5	6
					7	8
					9	10
					11	12
					13	14
					15	16
					17	18
					19	20
					21	22
					23	24
					25	26
					27	28
					29	30

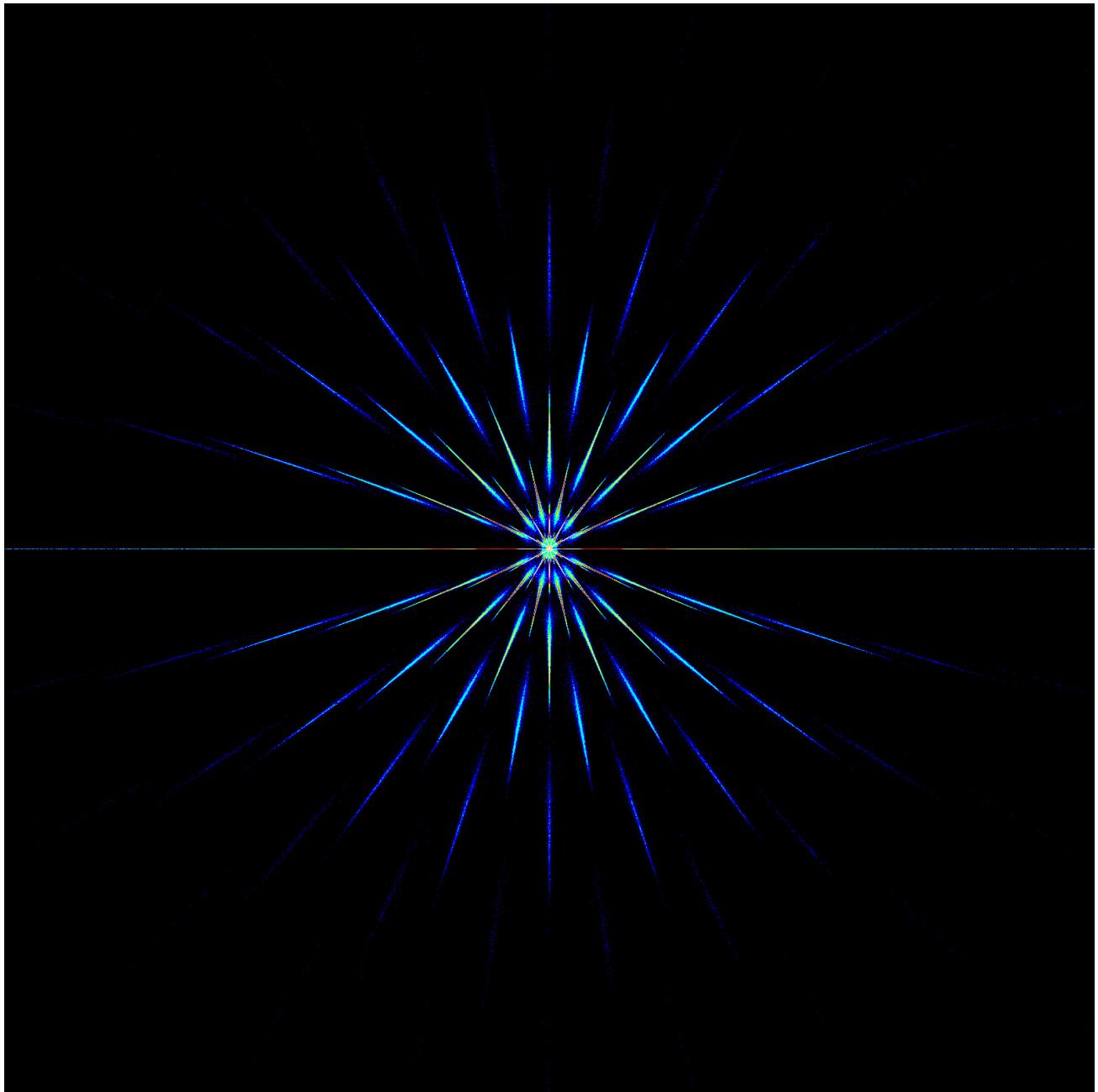
October 2021



Upper Hessenberg Toeplitz matrices with diagonal entries fixed at 0, subdiagonal entries fixed at 1, and $P = (-1, 0, 1)$. Dimension $m = 12$, sample of 100 million matrices. Image ©(2018) Eunice Y. S. Chan, Robert M. Corless and Steven E. Thornton

							October
M	T	W	T	F	S	S	M T W T F S S
1	2	3	4	5	6	7	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
8	9	10	11	12	13	14	
15	16	17	18	19	20	21	
22	23	24	25	26	27	28	
29	30						
							December
							M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

November 2021



Anti-tridiagonal with visible rounding errors in close-up (corners at ± 0.05). $m = 20$, $P = (-1, 0, 1)$, sample of 25 million matrices
Image ©(2017) Robert M. Corless and Steven E. Thornton

							November								
M	T	W	T	F	S	S		M	T	W	T	F	S	S	
								1	2	3	4	5			
6	7	8	9	10	11	12		15	16	17	18	19	20	21	
13	14	15	16	17	18	19		22	23	24	25	26	27	28	
20	21	22	23	24	25	26		29	30						
27	28	29	30	31											

							January								
M	T	W	T	F	S	S		M	T	W	T	F	S	S	
								1	2						
								3	4	5	6	7	8	9	
								10	11	12	13	14	15	16	
								17	18	19	20	21	22	23	
								24	25	26	27	28	29	30	
								31							

December 2021