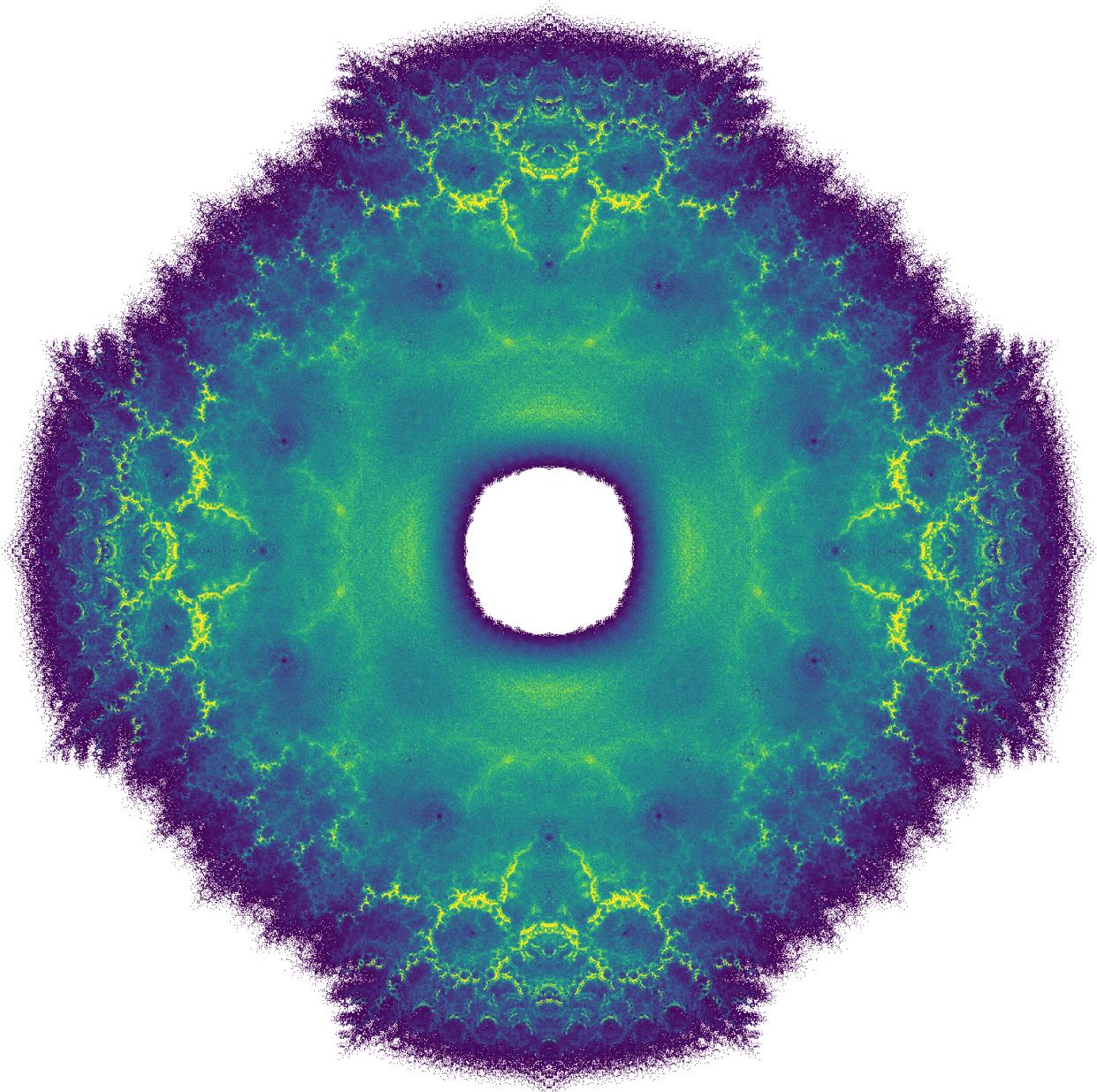


Bohemian Matrices
2021 Calendar



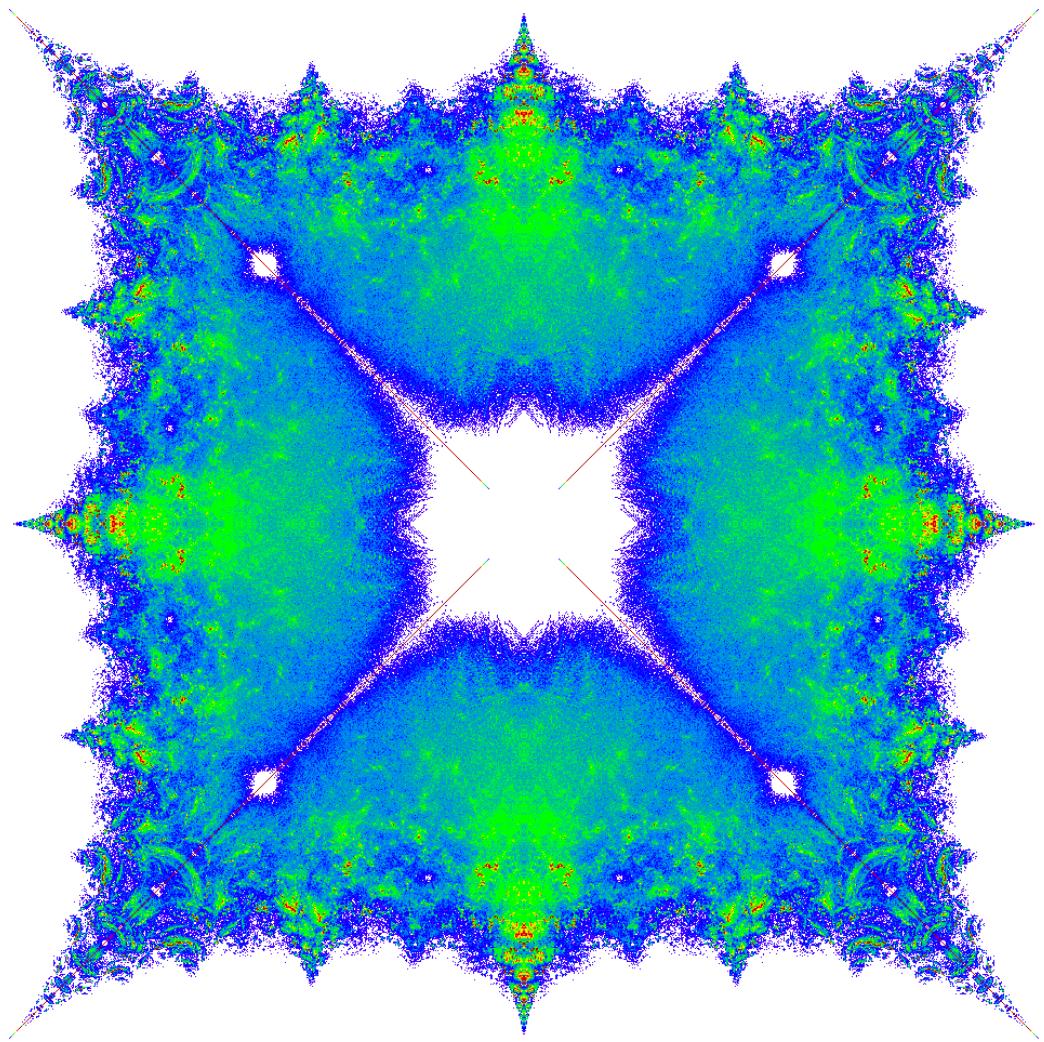
Skew-symmetric tridiagonal,
 $m = 10$, $P = (1, \alpha, \alpha^3, \bar{\alpha}, \bar{\alpha}^3, i)$ where $\alpha = \exp(\pi i/8)$.
 Image ©(2020) Robert M. Corless and Steven E. Thornton

S	M	T	W	T	F	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						
S	M	T	W	T	F	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						
S	M	T	W	T	F	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



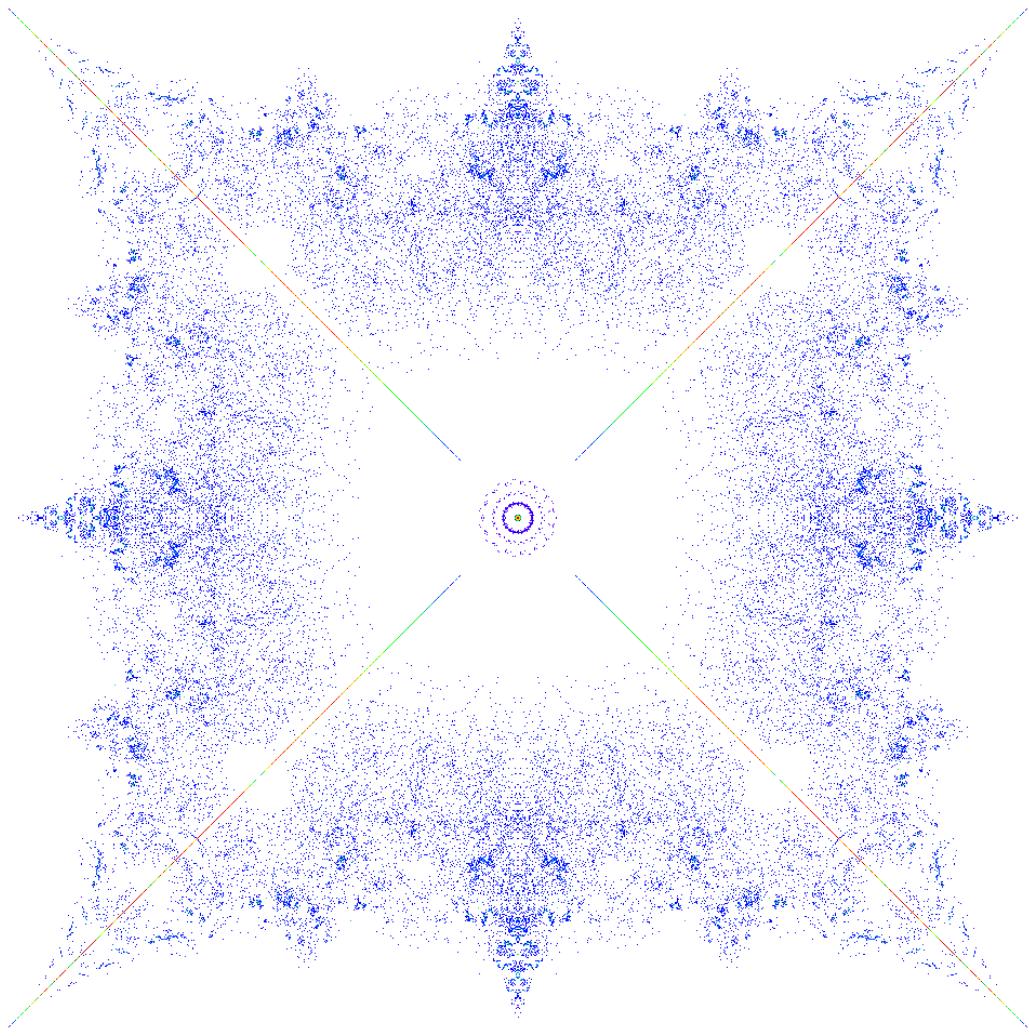
Skew-symmetric tridiagonal,
 $m = 22, P = 1 \pm i$.
 Image ©(2020) Robert M. Corless

S	M	T	W	T	F	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						
S	M	T	W	T	F	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						
S	M	T	W	T	F	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



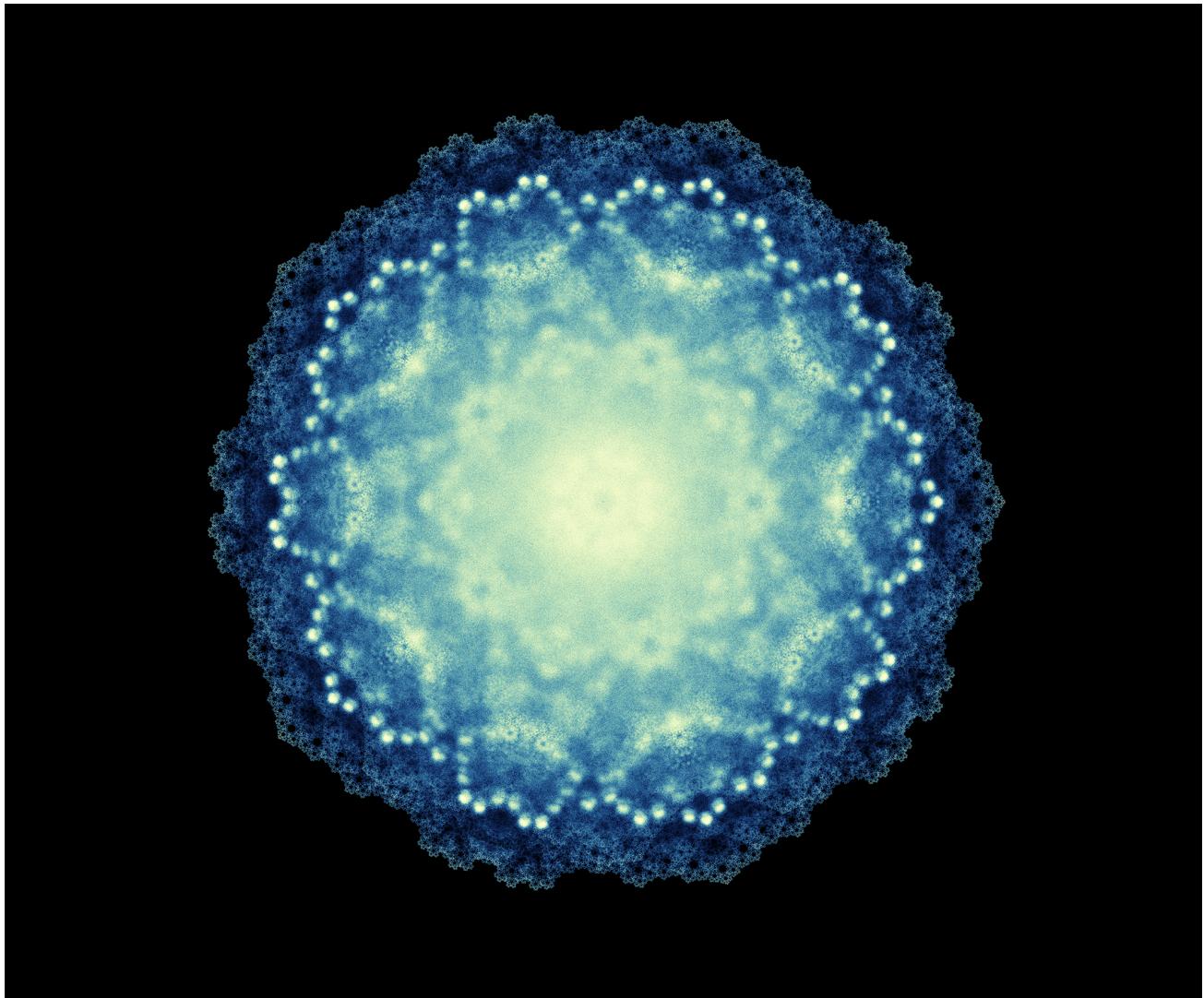
Skew-symmetric tridiagonal with visible rounding errors
 $m = 15$, $P = 1 \pm i$.
Image ©(2020) Robert M. Corless

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

April						
S	M	T	W	T	F	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	

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.

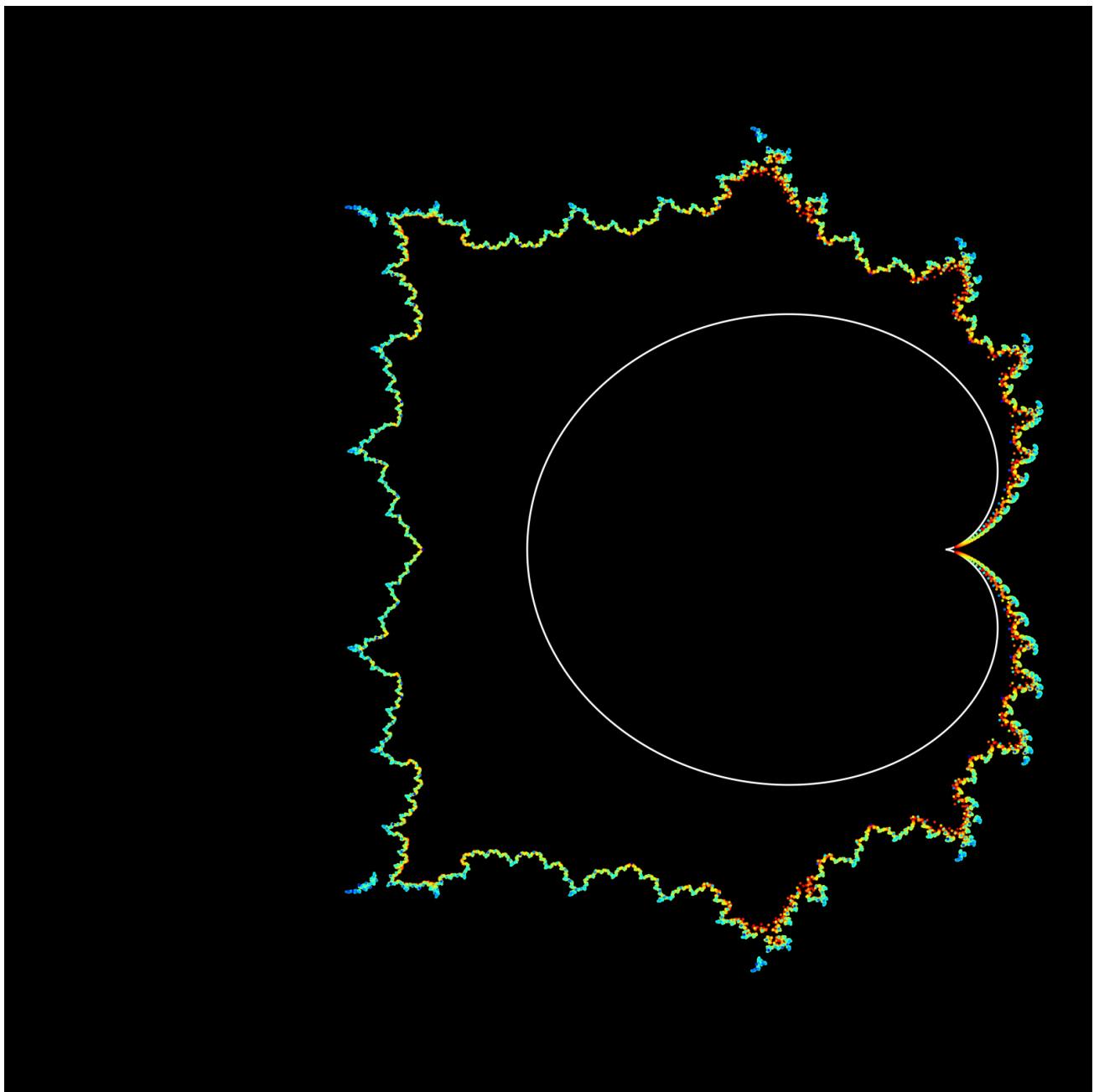
Image ©(2020) Robert M. Corless and Steven E. Thornton

S	M	T	W	T	F	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	

March						
S	M	T	W	T	F	S
				1	2	3
				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	

May						
S	M	T	W	T	F	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



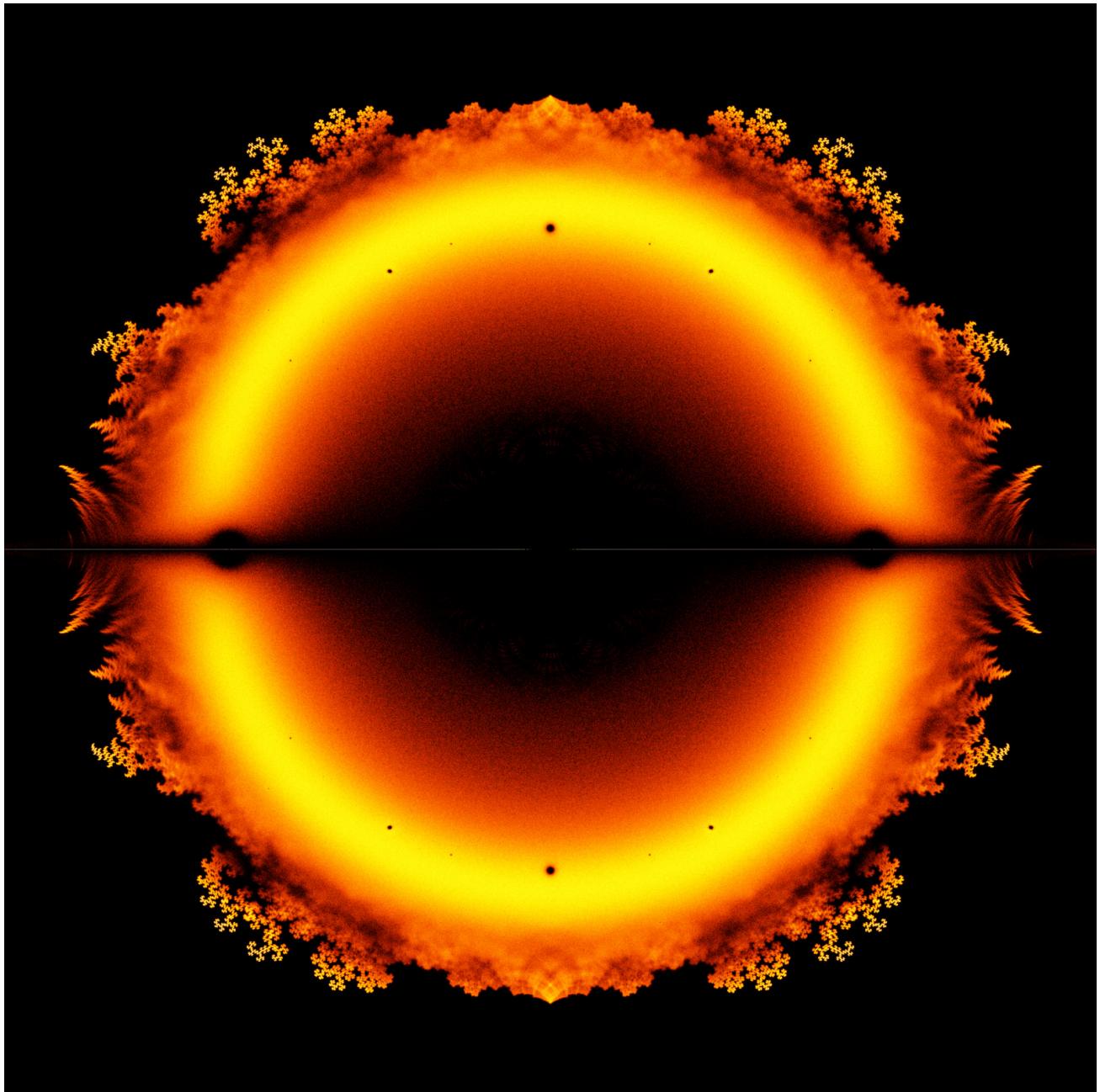
Complex roots of the Fibonacci-Mandelbrot polynomials defined by $q_0 = 0$, $q_1 = 1$, $q_{n+1} = zq_nq_{n-1} + 1$ for n from 4 through 30.
Image ©(2015) Eunice Y. S. Chan and Robert M. Corless

S	M	T	W	T	F	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						
S	M	T	W	T	F	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			

June						
S	M	T	W	T	F	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



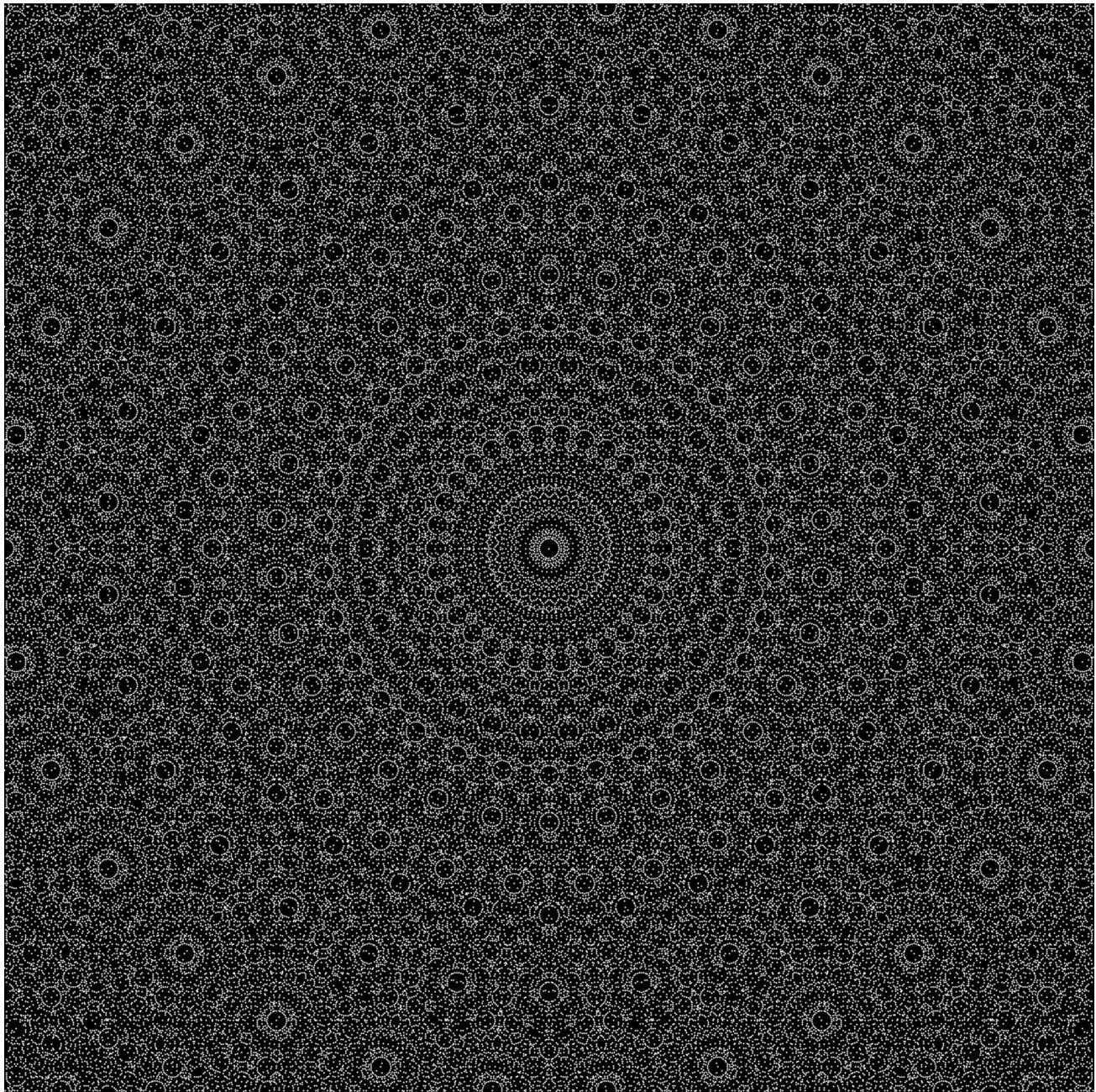
Doubly companion matrices with population ± 1 . Dimension $m = 19$, sample of 10 million matrices.
Image ©(2018) Robert M. Corless and Steven E. Thornton

S	M	T	W	T	F	S
				1	2	3
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						
S	M	T	W	T	F	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						
S	M	T	W	T	F	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



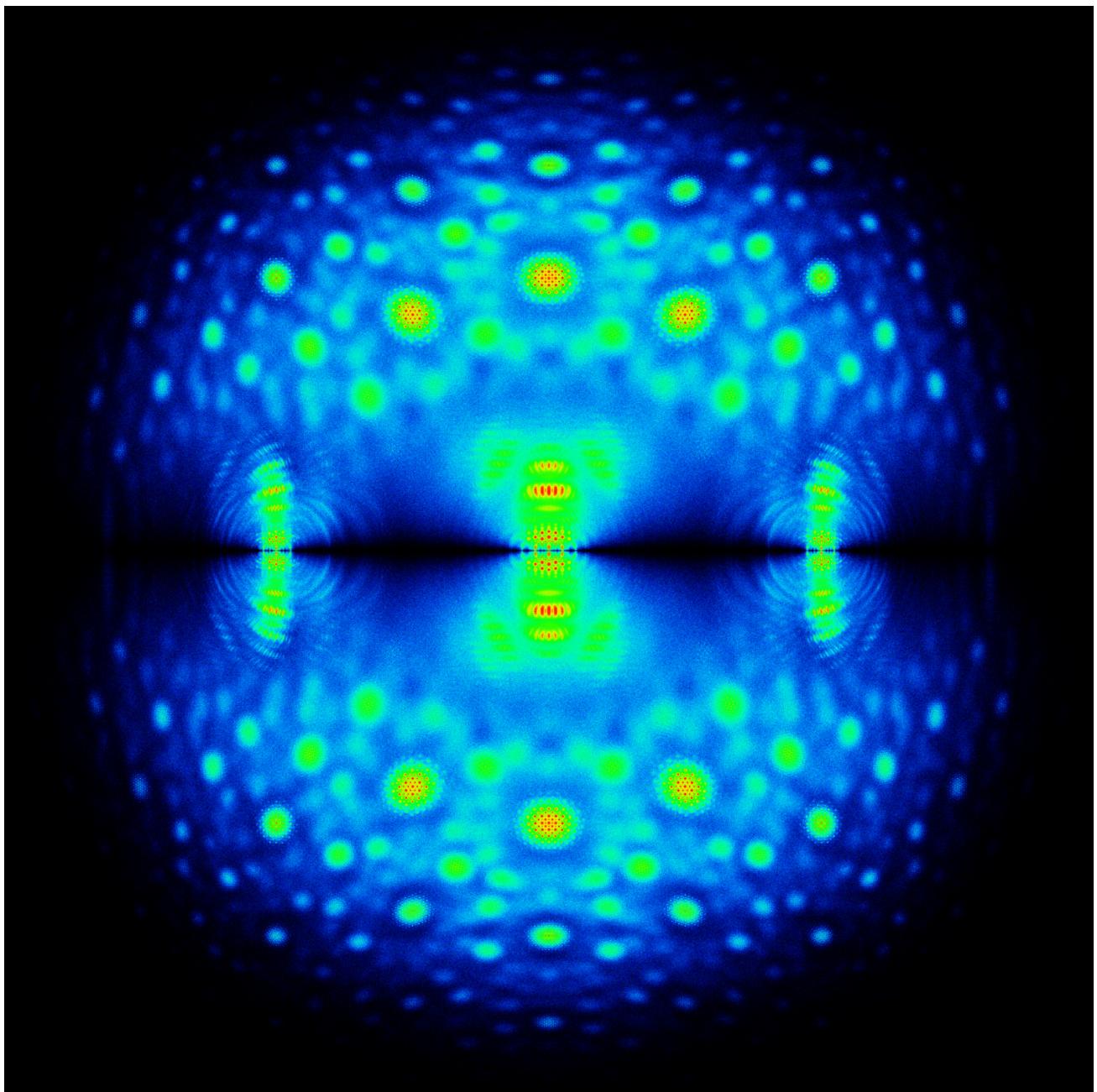
Circulant matrices with population $(-1, 0, 1)$. Dimension $m = 15$, sample of 5 million matrices.
Image ©(2015) Robert M. Corless and Jonathan Briño-Tarasoff

S	M	T	W	T	F	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						
S	M	T	W	T	F	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						
S	M	T	W	T	F	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		

July 2021



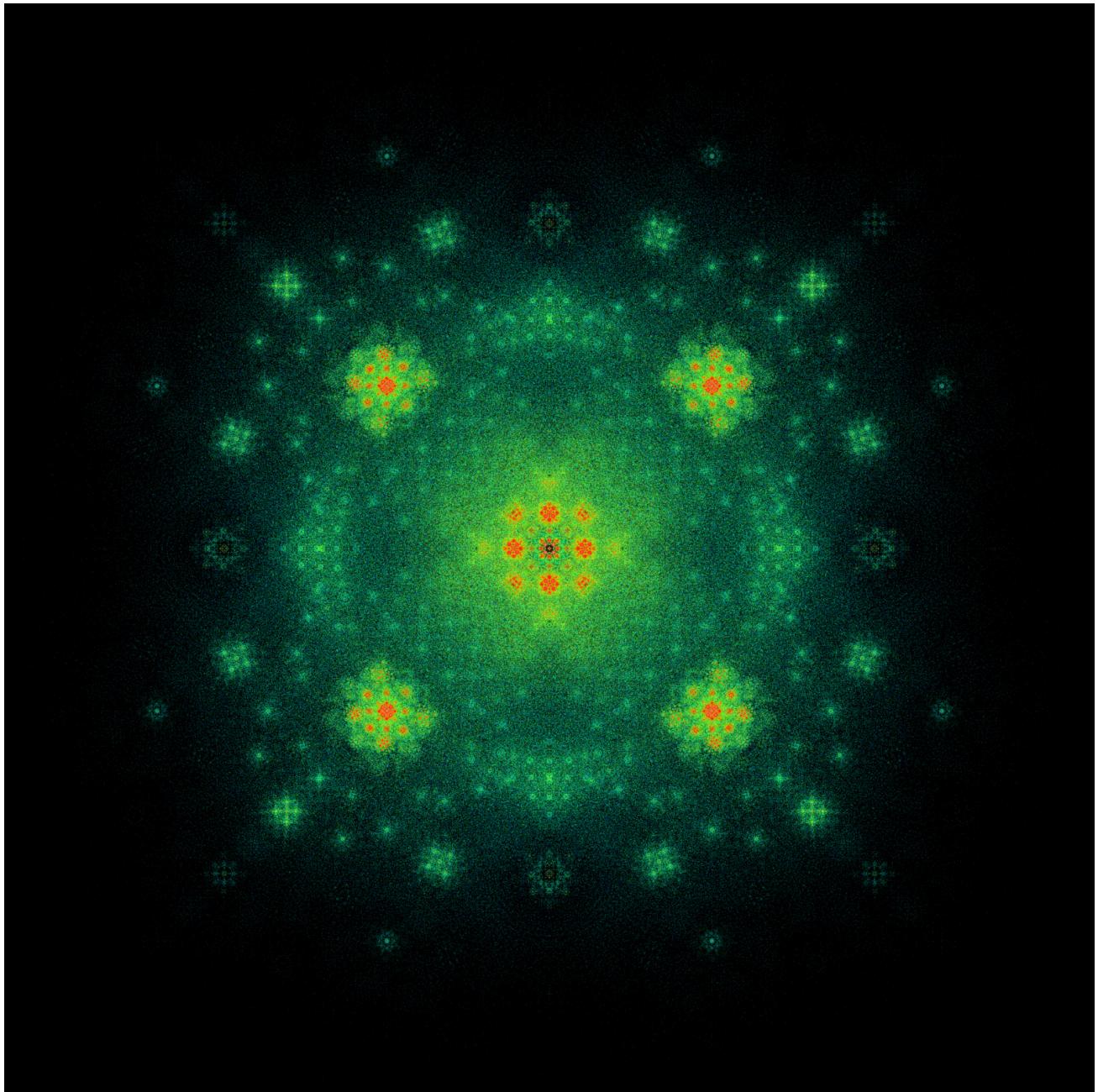
Unstructured matrices with population $(-20, -1, 0, 1, 20)$. Dimension $m = 5$, sample of 73 million matrices.
Image ©(2017) Robert M. Corless and Steven E. Thornton

S	M	T	W	T	F	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						
S	M	T	W	T	F	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					

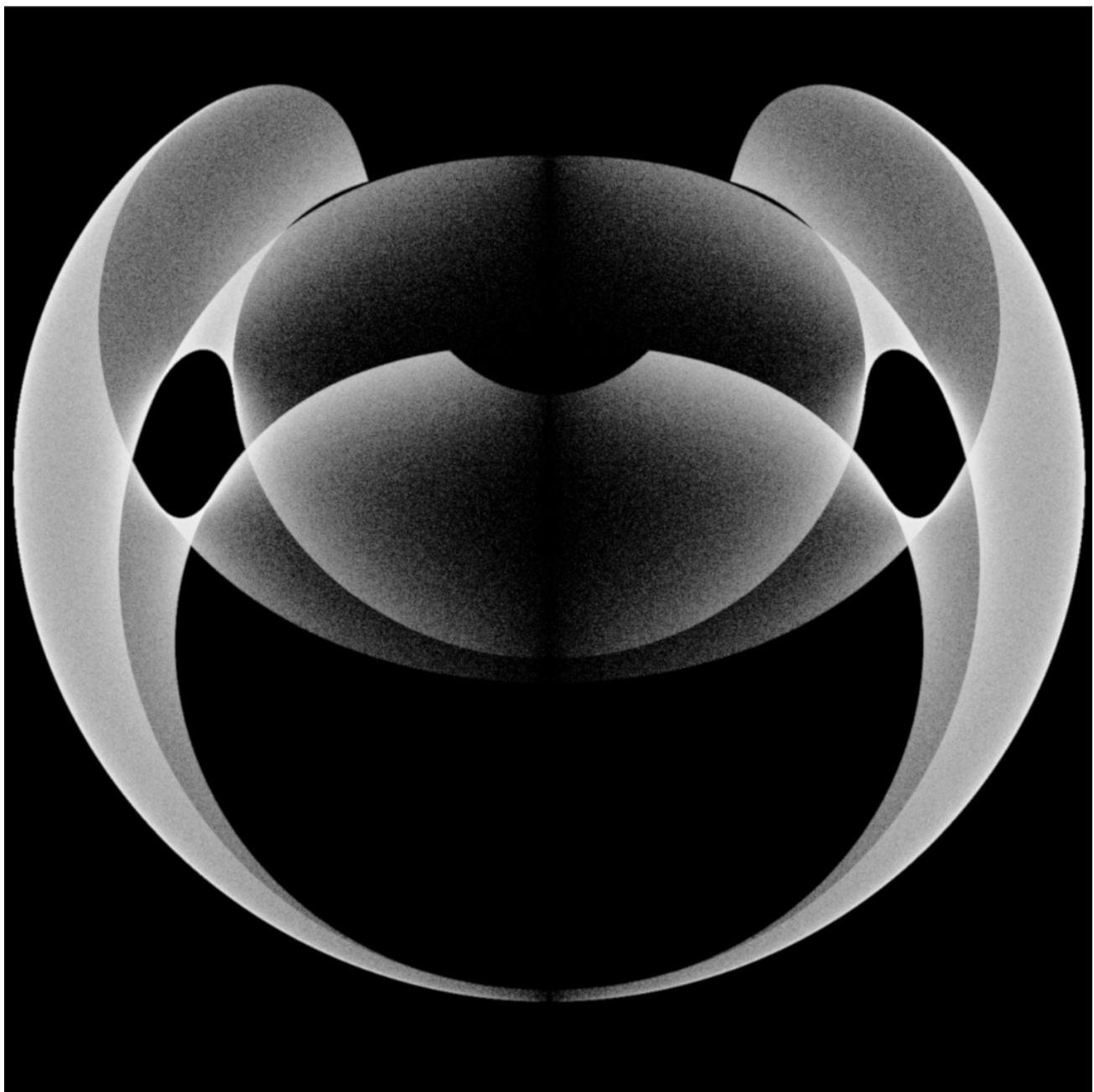
September						
S	M	T	W	T	F	S
						1 2 3 4
	5 6 7 8 9 10 11					
	12 13 14 15 16 17 18					
	19 20 21 22 23 24 25					
	26 27 28 29 30					

August 2021



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

S	M	T	W	T	F	S	August						
5	6	7	8	9	10	11	S	M	T	W	T	F	S
12	13	14	15	16	17	18	1	2	3	4	5	6	7
19	20	21	22	23	24	25	8	9	10	11	12	13	14
26	27	28	29	30			15	16	17	18	19	20	21
September 2021							October						
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					24	25	26	27	28	29	30
							31						



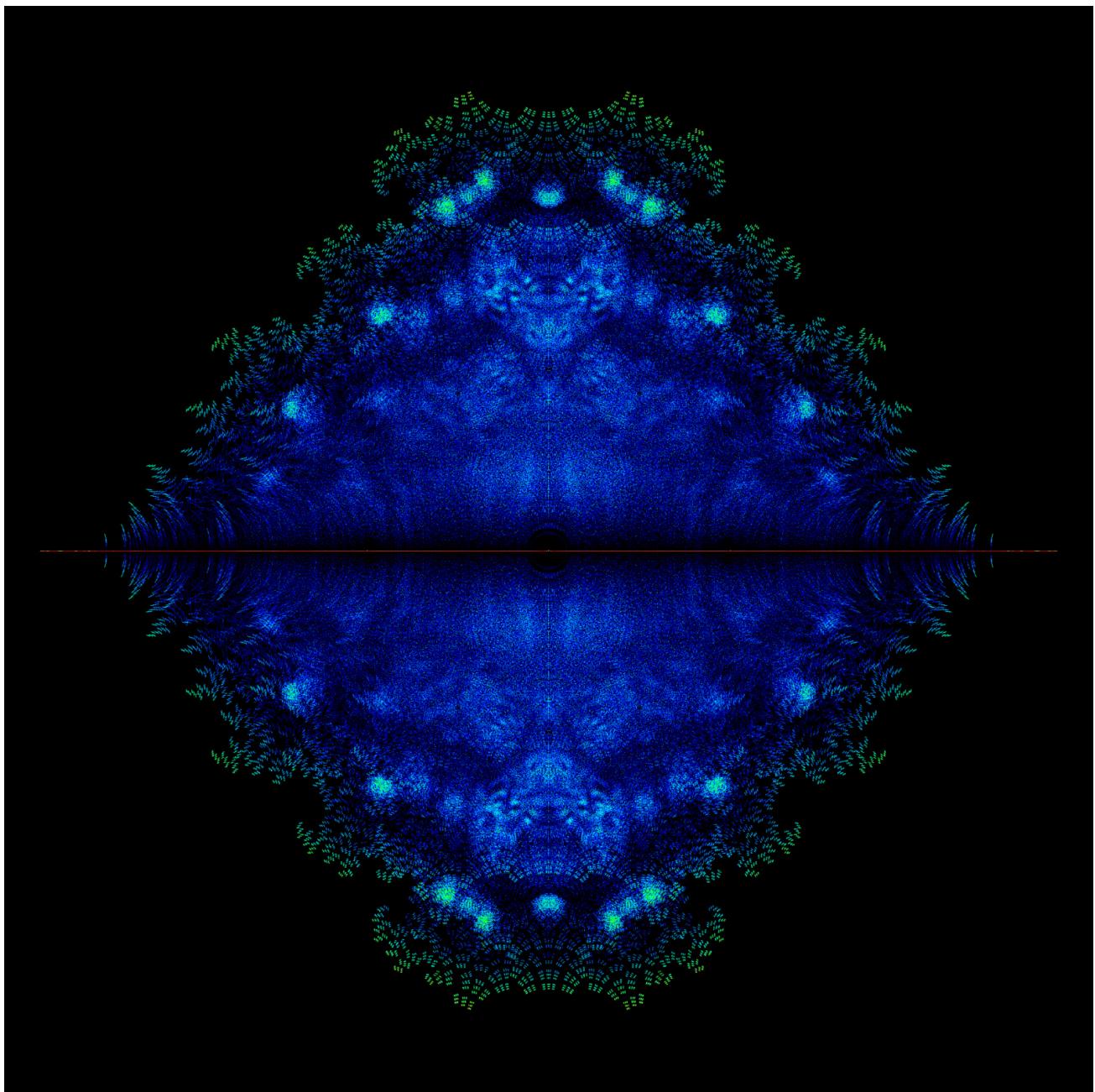
Eigenfish 3 from www.bohemianmatrices.com, rotated 90 degrees.
Image ©(2020) Robert M. Corless and Steven E. Thornton

S	M	T	W	T	F	S
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						
S	M	T	W	T	F	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						
S	M	T	W	T	F	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

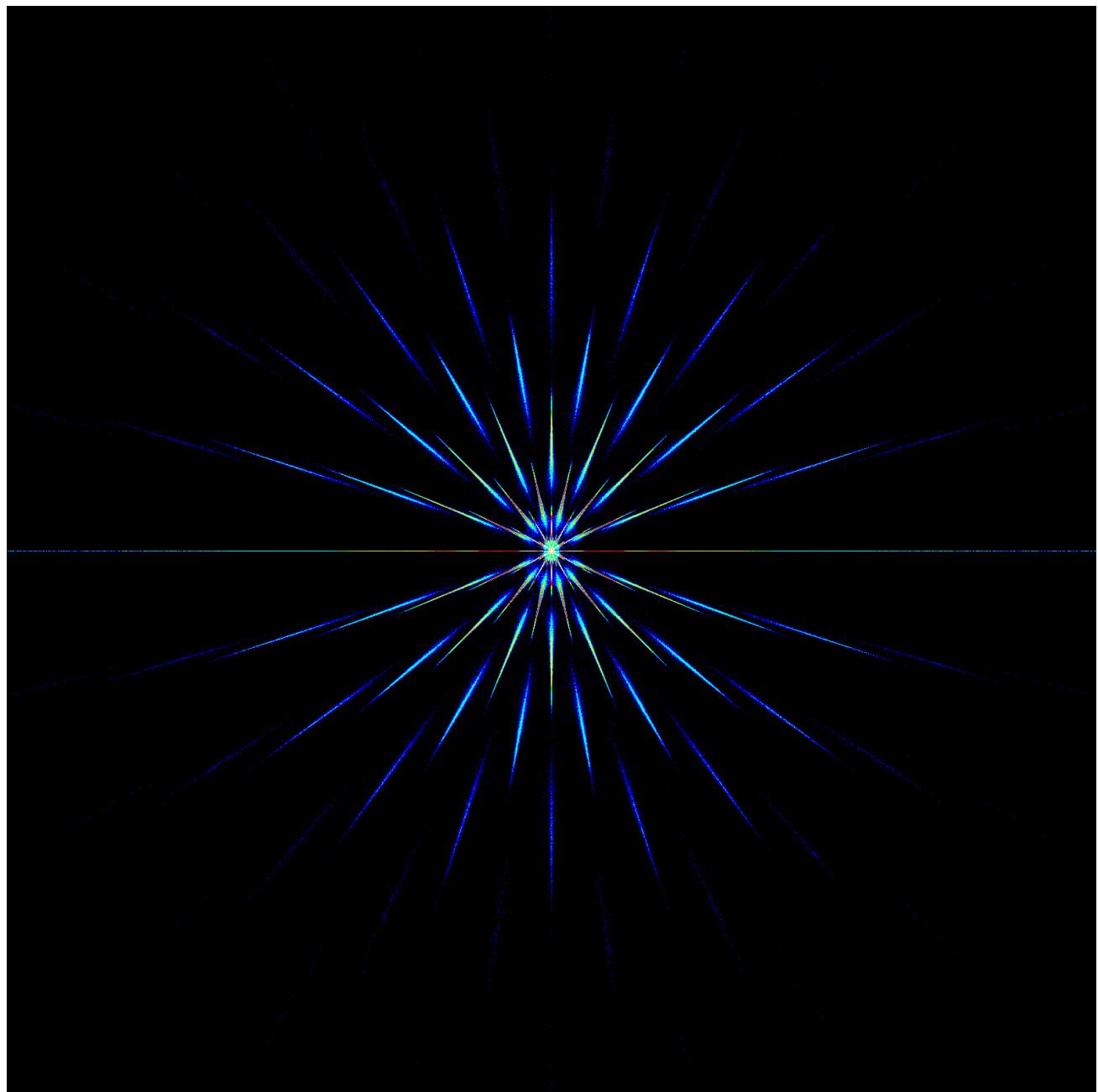


Upper Hessenberg Toeplitz matrices with diagonal entries fixed at 0, subdiagonal entries fixed at 1, and $P = (-1, 0, 1)$. Dimension $m = 12$, sample of 100 million matrices. Image ©(2018) Eunice Y. S. Chan, Robert M. Corless and Steven E. Thornton

							October
S	M	T	W	T	F	S	
							S M T W T F 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
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					

							December
S	M	T	W	T	F	S	
							S M T W T F 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

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

January						
S	M	T	W	T	F	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