**UNBOUNDED DIGIT EXPANSION AND INFINITE ATTRACTOR STRUCTURE IN A DETERMINISTIC INTEGER MAP.**

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March 3rd ,2026.

**Abstract**

We investigate a previously undocumented integer transformation whose explosive behavior places it beyond the known extremes of Collatz-type dynamics. The system operates by (1) squaring each digit of an integer and concatenating the results, then (2) repeatedly compressing the expanded sequence by summing every consecutive triplet of digits whenever the total length remains divisible by three. This deceptively elementary process generates combinatorial shockwaves: numerical structures routinely balloon to hundreds or thousands of digits before undergoing catastrophic collapse into a microscopic attractor set.

Across exhaustive computational testing including high-entropy seeds, palindromes, repdigits, ultra-sparse integers and integers engineered to maximize combinatorial explosion, every initial high value eventually converges to a rigid attractor state, most frequently the fixed points 10, 11, 1010, 1110, 1011 and selective hyper ones for example 11111, 1111111111, 11111111111111111111111111111111 and selective 1-zero-1 forms for example 10000000000000000000000000000000000000001 and other attractors such as 10111011, 10101011, 1110111, 1111101011, 10101111, 1010111011, 11101011, 11101110, 1110111011,
10101010101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010,
10111011101110111011101110111011101110111011101110111011101110111011101110111011
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[1] Hyper explosive growth (worse than Collatz or Kaprekar by orders of magnitude)

[2] Absolute-deterministic convergence (unlike chaos systems)

[3] Multiple fixed-point attractors (unlike Collatz's single cycle hypothesis)

[4] Digit level physics (a totally new regime)

This puts the transformation in its own class: a violent digit dynamic system with guaranteed stabilization.

It is rare in mathematics for a process to be simple, computationally explosive, empirically universal, convergent across all tests and structurally rich enough to generate attractors.

Systems with this combination of traits are historically rare. When they appear, Collatz (1937), Kaprekar (1949) and Conway's FRACTRAN (1987), they generate decades of interest, cross disciplinary analysis and deep open questions.

Our system volatile growth phase is far more dramatic than any of the classics.

**2.Illustrations**

**2.1 The number 1000081**

This number takes 7 steps to reach the stable number 11 as illustrated below:

Enter the starting number: 1000081

Step 1 (current number): 1000081

-> After squaring digits: 10000641

Step 2 (current number): 10000641

-> After squaring digits: 1000036161

Step 3 (current number): 1000036161

-> After squaring digits: 100009361361

-> After summing groups of 3: 191010

-> After summing groups of 3: 111

-> After summing groups of 3: 3

Step 4 (current number): 3

-> After squaring digits: 9

Step 5 (current number): 9

-> After squaring digits: 81

Step 6 (current number): 81

-> After squaring digits: 641

-> After summing groups of 3: 11

Step 7 (current number): 11

-> After squaring digits: 11

Brutal stable number reached: 11

**2.2 The number 855544410**

This number takes 22 steps to reach the stable number 1011 as illustrated below:

Enter the starting number: 855544410

Step 1 (current number): 855544410

-> After squaring digits: 6425252516161610

Step 2 (current number): 6425252516161610

-> After squaring digits: 36164254254251361361 0610

-> After summing groups of 3: 10121111910107

Step 3 (current number): 10121111910107

-> After squaring digits: 1014111181101049

Step 4 (current number): 1014111181101049

-> After squaring digits: 10116111164110101681

Step 5 (current number): 10116111164110101681

-> After squaring digits: 1011361111361611010136641

Step 6 (current number): 1011361111361611010136641

-> After squaring digits: 101193611119361361 1010193636161

Step 7 (current number): 10119361111936136110101936361 61

-> After squaring digits: 10118193611118193619361101018193693613 61

Step 8 (current number): 10118193611118193619361101018193693613 61

-> After squaring digits: 10116418193611116418193618193611010164181936819361936 1

-> After summing groups of 3: 21110183111018101822111817131610

Step 9 (current number): 21110183111018101822111817131610

-> After squaring digits: 41110164911101641016444111641491913610

Step 10 (current number): 41110164911101641016444111641491913610

-> After squaring digits: 16111013616811110136161013616161611136161168118119361 0

-> After summing groups of 3: 82101532107108133108151013 7

-> After summing groups of 3: 11668979611

Step 11 (current number): 11668979611

-> After squaring digits: 113636648149813611

-> After summing groups of 3: 5151814128

Step 12 (current number): 5151814128

-> After squaring digits: 251251641161464

-> After summing groups of 3: 8811814

Step 13 (current number): 8811814

-> After squaring digits: 64641164116

Step 14 (current number): 64641164116

-> After squaring digits: 361636161136161136

-> After summing groups of 3: 1015810810

Step 15 (current number): 1015810810

-> After squaring digits: 1012564106410

Step 16 (current number): 1012564106410

-> After squaring digits: 101425361610361610

-> After summing groups of 3: 211107107

-> After summing groups of 3: 488

-> After summing groups of 3: 20

Step 17 (current number): 20

-> After squaring digits: 40

Step 18 (current number): 40

-> After squaring digits: 160

-> After summing groups of 3: 7

Step 19 (current number): 7

-> After squaring digits: 49

Step 20 (current number): 49

-> After squaring digits: 1681

Step 21 (current number): 1681

-> After squaring digits: 136641

-> After summing groups of 3: 1011

Step 22 (current number): 1011

-> After squaring digits: 1011

Brutal stable number reached: 1011

**2.3 The number 88888**

This number takes 13 steps to reach the stable number 1111111111 as illustrated below:

Enter the starting number: 88888

Step 1 (current number): 88888

-> After squaring digits: 6464646464

Step 2 (current number): 6464646464

-> After squaring digits: 361636163616361636

Step 3 (current number): 36163616361636163616

-> After squaring digits: 9361369361369361369

Step 13 (current number): 1111111111

-> After squaring digits: 1111111111

Brutal stable number reached: 1111111111

**2.4 The number 186660000006**

This number takes 23 steps to reach the stable number 11 as illustrated below:

Enter the starting number: 186660000006

Step 1 (current number): 186660000006

-> After squaring digits: 16436363600000036

Step 2 (current number): 16436363600000036

-> After squaring digits: 13616936936936000000936

Step 3 (current number): 1361693693693600000936

-> After squaring digits: 193613681936819368193600000081936

-> After summing groups of 3: 1310151818171360918

Step 4 (current number): 1310151818171360918

-> After squaring digits: 191012516416414491936081164

Step 5 (current number): 19101251641641491936081164

-> After squaring digits: 18110142513616136161168118193606411 3616

-> After summing groups of 3: 1021110810815101810513

Step 6 (current number): 1021110810815101810513

-> After squaring digits: 1041110641064125101641025 19

-> After summing groups of 3: 531077611315

-> After summing groups of 3: 91489

Step 7 (current number): 91489

-> After squaring digits: 811166481

-> After summing groups of 3: 101313

-> After summing groups of 3: 27

Step 8 (current number): 27

-> After squaring digits: 449

-> After summing groups of 3: 17

Step 9 (current number): 17

-> After squaring digits: 149

-> After summing groups of 3: 14

Step 10 (current number): 14

-> After squaring digits: 116

-> After summing groups of 3: 8

Step 11 (current number): 8

-> After squaring digits: 64

Step 12 (current number): 64

-> After squaring digits: 3616

Step 13 (current number): 3616

-> After squaring digits: 936136

-> After summing groups of 3: 1810

Step 14 (current number): 1810

-> After squaring digits: 16410

Step 15 (current number): 16410

-> After squaring digits: 1361610

Step 16 (current number): 1361610

-> After squaring digits: 193613610

-> After summing groups of 3: 13107

Step 17 (current number): 13107

-> After squaring digits: 191049

-> After summing groups of 3: 1113

Step 18 (current number): 1113

-> After squaring digits: 1119

Step 19 (current number): 1119

-> After squaring digits: 11181

Step 20 (current number): 11181

-> After squaring digits: 111641

-> After summing groups of 3: 311

-> After summing groups of 3: 5

Step 21 (current number): 5

-> After squaring digits: 25

Step 22 (current number): 25

-> After squaring digits: 425

-> After summing groups of 3: 11

Step 23 (current number): 11

-> After squaring digits: 11

Brutal stable number reached: 11

**2.4 The number**
**444444444

Enter the starting number:
444444444

-> After squaring digits:
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010

Brutal stable number reached:
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010101010101010101010101010101010101010101010101010
10101010101010101010101010

**2.5 The number**
**77777777777777777777777777777777777777777777777777777777777777777777777777**
**77777777777777777777777777777777777777777777777777777777777777777777777777**
**77777777777777777777777777777777777777777777777777777777777777777777777777**
**77777777**

This number takes 4 steps to reach the stable number
10111011101110111011101110111011101110111011101110111011101110111011101110111011
10111011101110111011101110111011101110111011101110111011101110111011101110111011
10111011101110111011101110111011101110111011101110111011101110111011101110111011

Enter the starting number:
77777777777777777777777777777777777777777777777777777777777777777777777777
77777777777777777777777777777777777777777777777777777777777777777777777777
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Step 1 (current number):
77777777777777777777777777777777777777777777777777777777777777777777777777
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-> After squaring digits:
49494949494949494949494949494949494949494949494949494949494949494949494949
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Step 2 (current number):
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-> After squaring digits:
16811681168116811681168116811681168116811681168116811681168116811681168116811681
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Step 3 (current number):
168116811681168116811681168116811681168116811681168116811681168116811681168116811681168116811681168116811681

6641136641136641136641136641136641136641136641136641136641136641136641
1366411366411366411366411366411366411366411366411366411366411366411366641136641136641

-> After summing groups of 3:

10111011101110111011101110111011101110111011101110111011101110111011101110111011
10111011101110111011101110111011101110111011101110111011101110111011101110111011
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-> After squaring digits:

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Brutal stable number reached:

10111011101110111011101110111011101110111011101110111011101110111011101110111011
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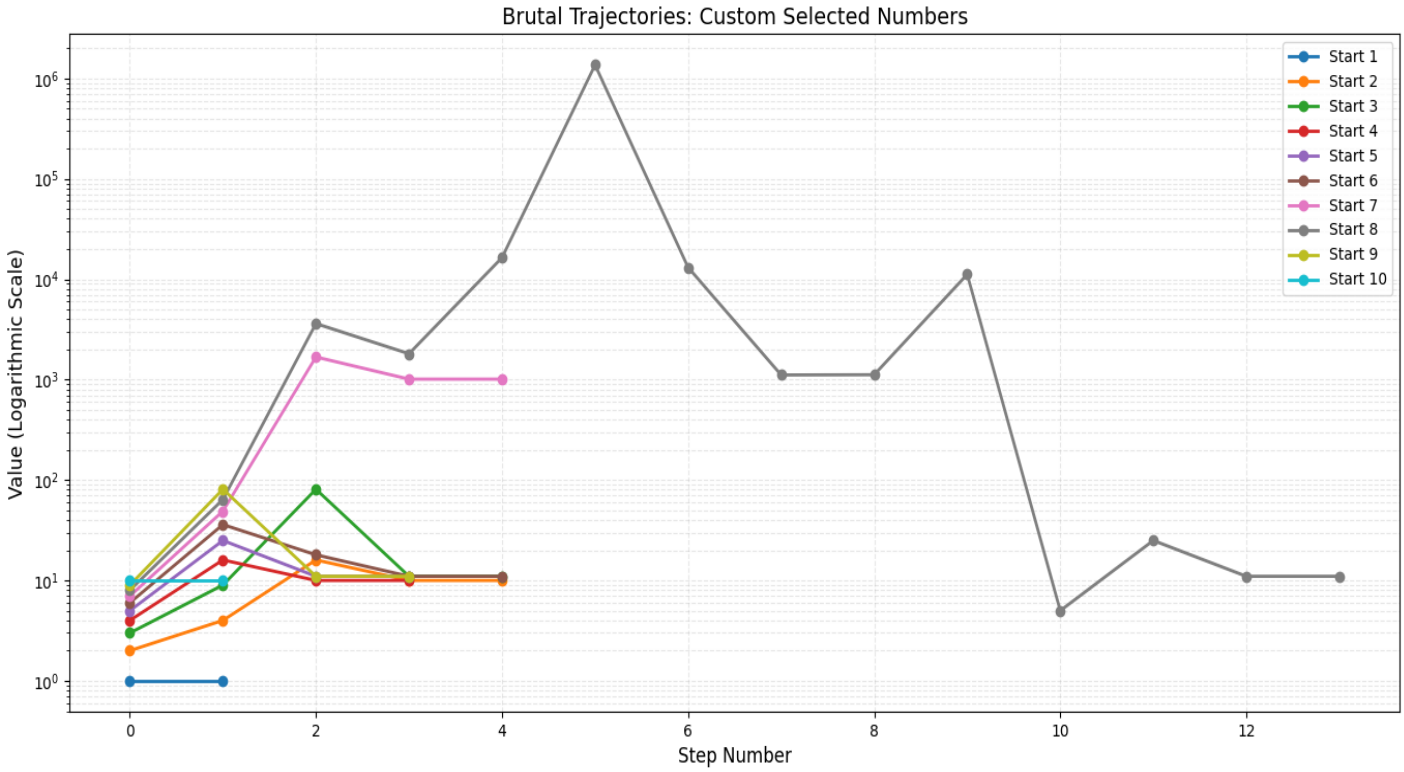
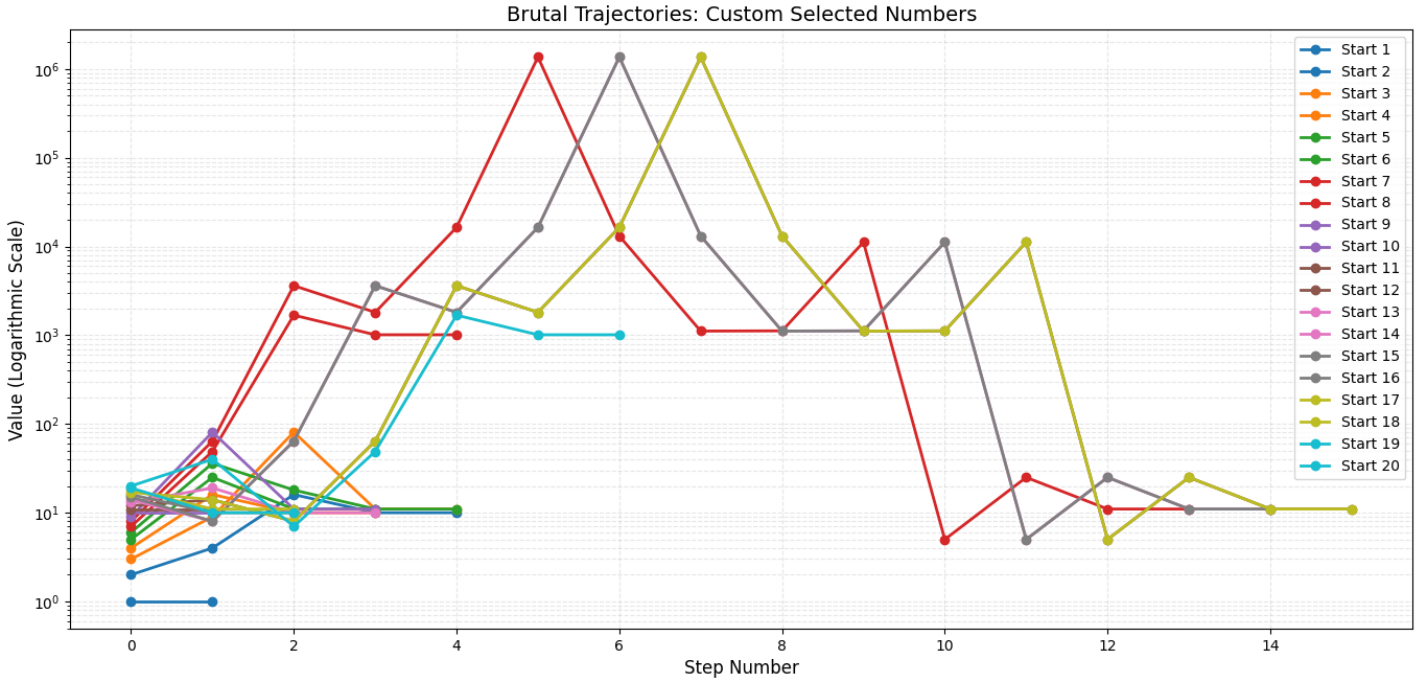
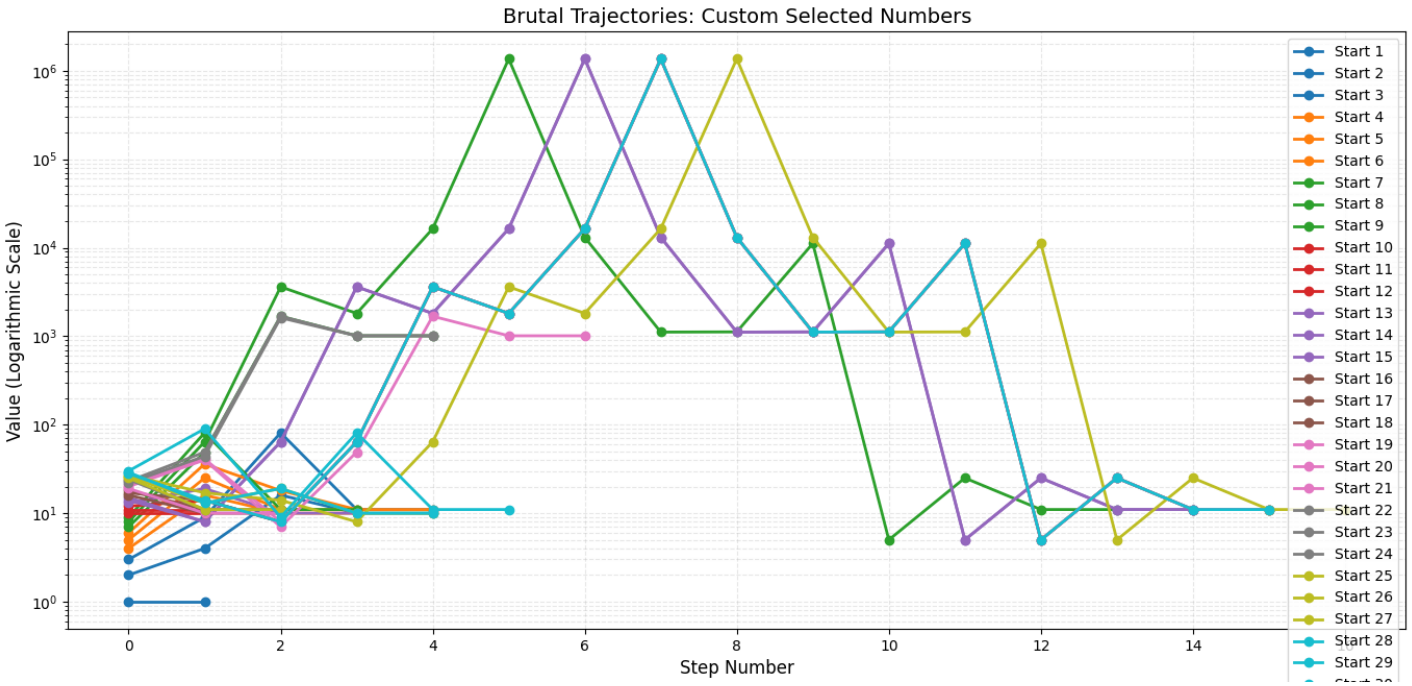
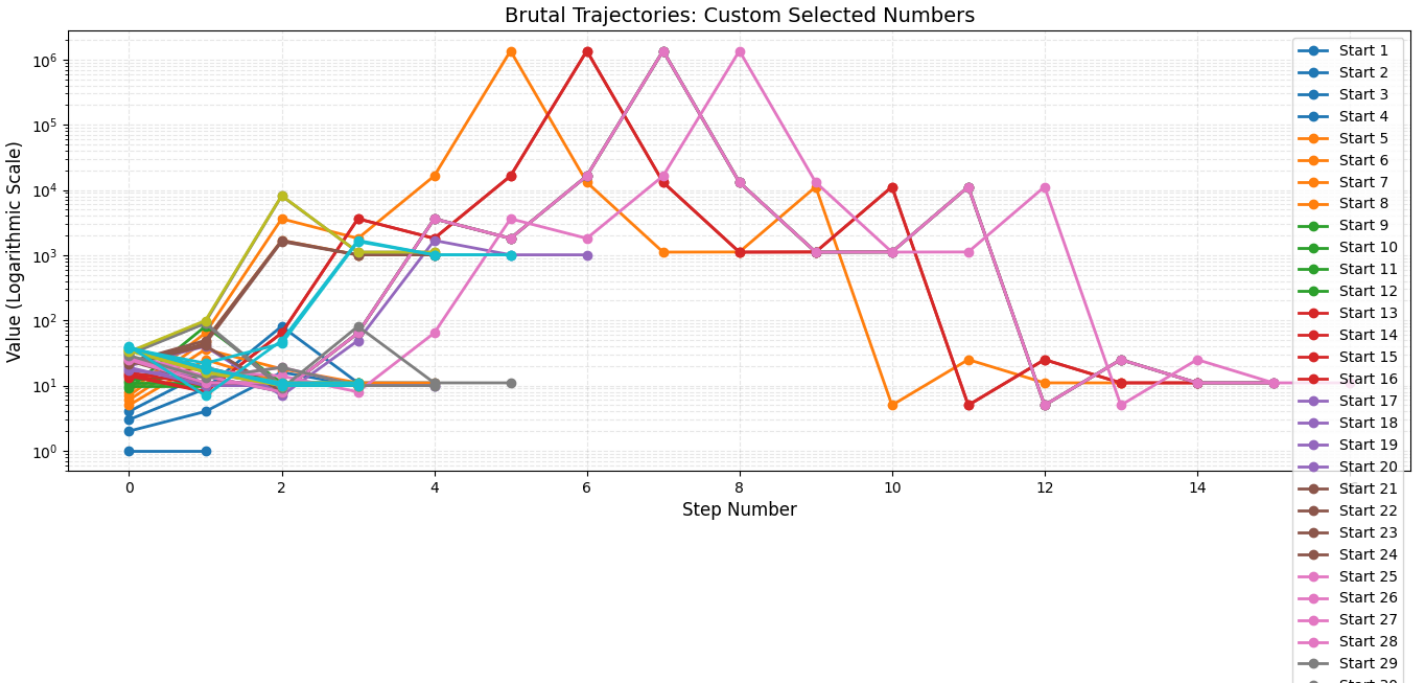
### 3. Visual Trajectories of Custom Selected Numbers




Brutal Trajectories: Custom Selected Numbers
Value (Logarithmic Scale)
Step Number
Start 1
Start 2
Start 3
Start 4
Start 5
Start 6
Start 7
Start 8
Start 9
Start 10
Start 11
Start 12
Start 13
Start 14
Start 15
Start 16
Start 17
Start 18
Start 19
Start 20
Start 21
Start 22
Start 23
Start 24
Start 25
Start 26
Start 27
Start 28
Start 29


Brutal Trajectories: Custom Selected Numbers
Value (Logarithmic Scale)
Step Number
Start 1
Start 2
Start 3
Start 4
Start 5
Start 6
Start 7
Start 8
Start 9
Start 10
Start 11
Start 12
Start 13
Start 14
Start 15
Start 16
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Start 18
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Start 22
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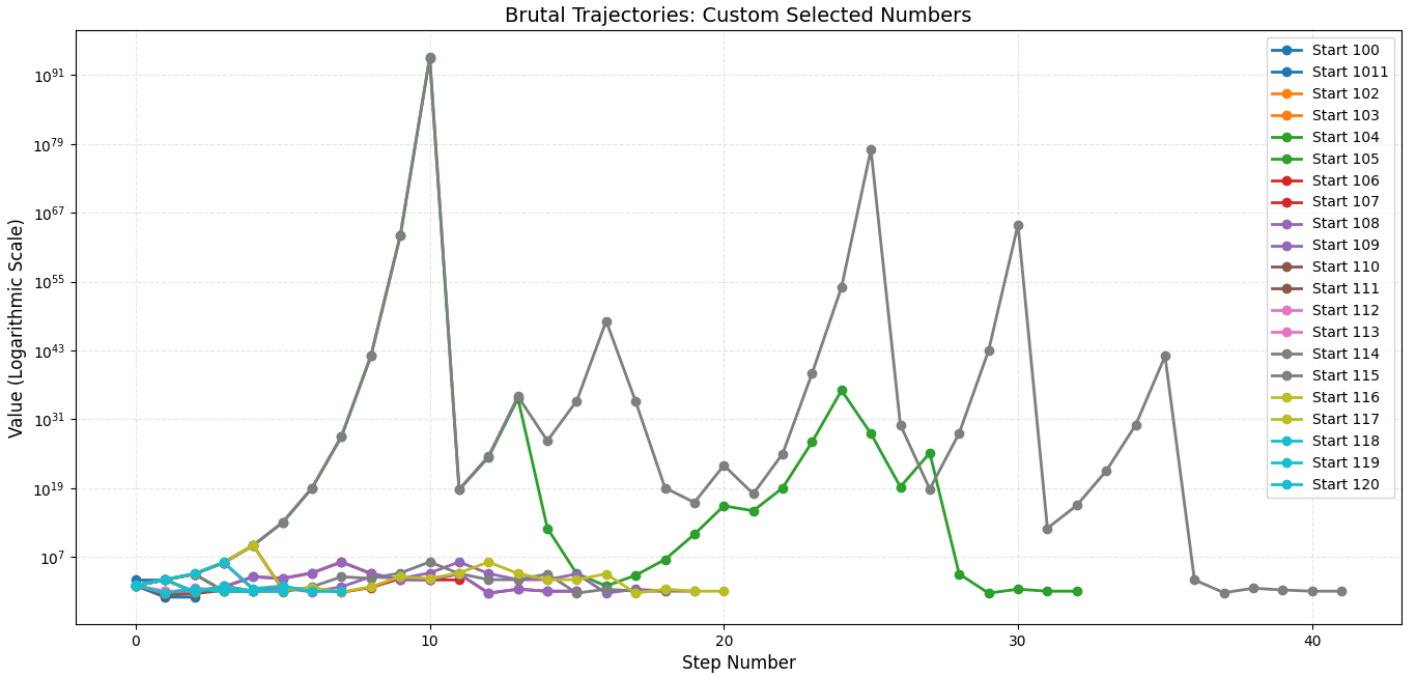
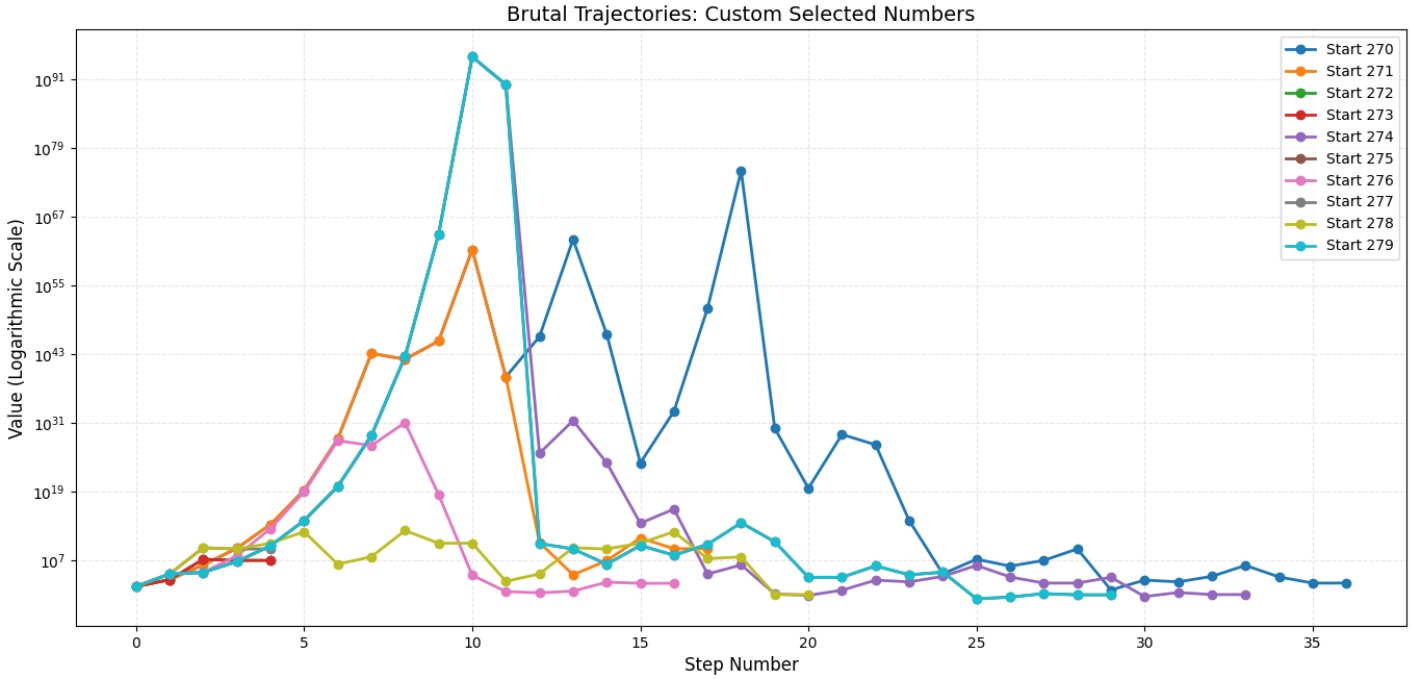
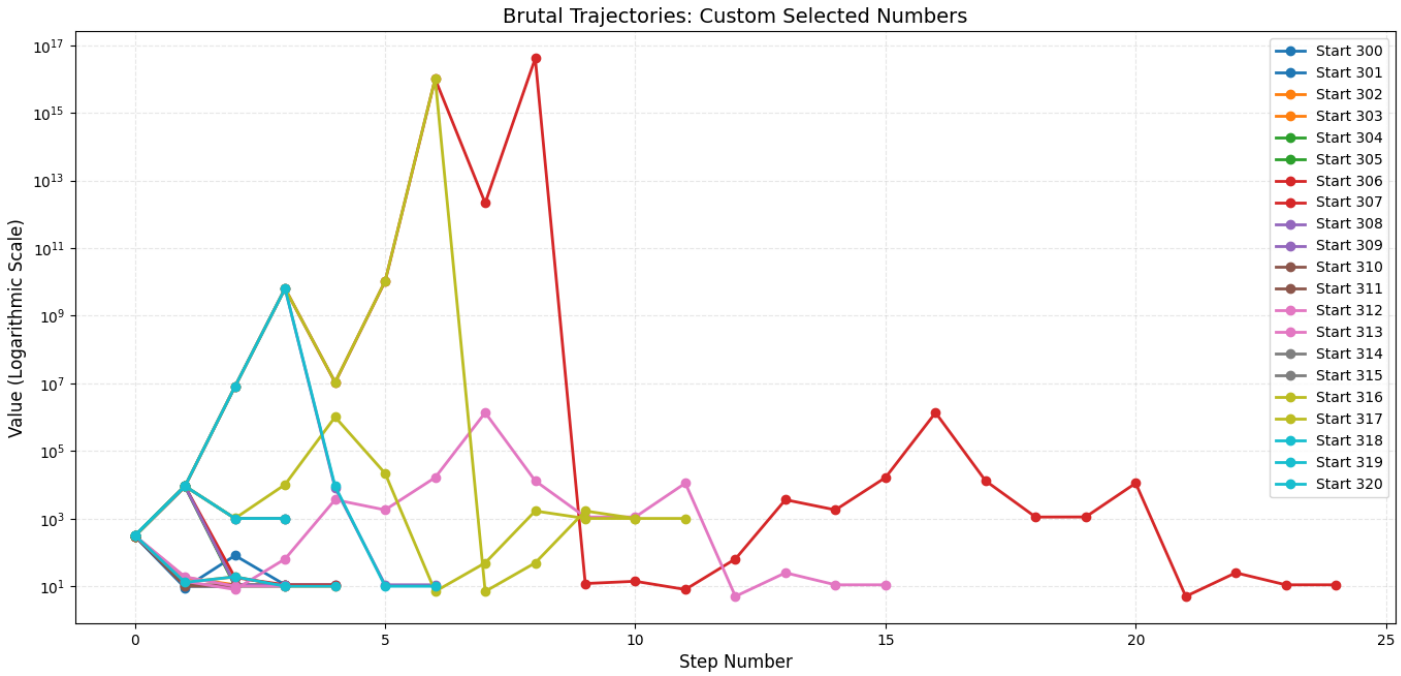
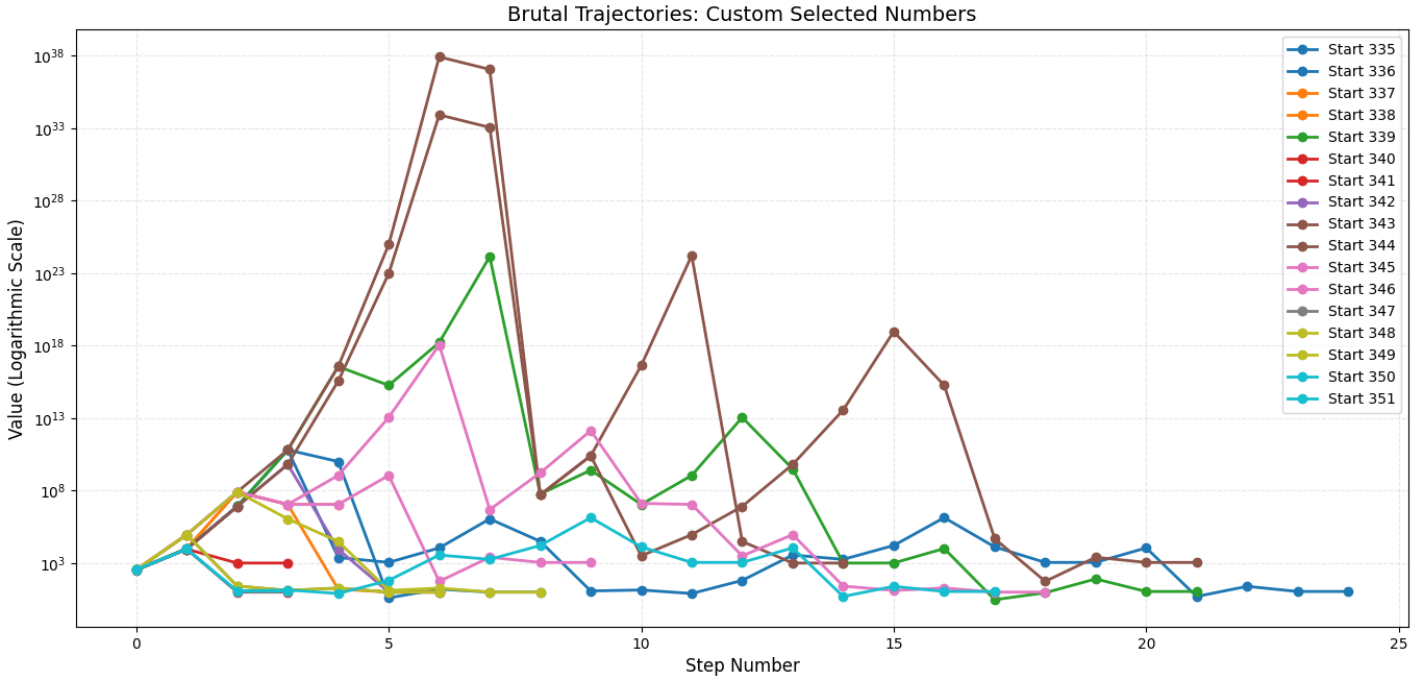
Start 24
Start 25
Start 26
Start 27
Start 28
Start 29


Brutal Trajectories: Custom Selected Numbers
Value (Logarithmic Scale)
Step Number
Start 100
Start 1011
Start 102
Start 103
Start 104
Start 105
Start 106
Start 107
Start 108
Start 109
Start 110
Start 111
Start 112
Start 113
Start 114
Start 115
Start 116
Start 117
Start 118
Start 119
Start 120


Brutal Trajectories: Custom Selected Numbers
Value (Logarithmic Scale)
Step Number
Start 270
Start 271
Start 272
Start 273
Start 274
Start 275
Start 276
Start 277
Start 278
Start 279




**4. Tables showing numbers, number of steps to their attractor and their respective attractor types.**

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 1 | 1 | 1 |
| 2 | 4 | 10 |
| 3 | 4 | 11 |
| 4 | 3 | 10 |
| 5 | 3 | 11 |
| 6 | 4 | 11 |
| 7 | 4 | 1011 |
| 8 | 13 | 11 |
| 9 | 3 | 11 |
| 10 | 1 | 10 |
| 11 | 1 | 11 |
| 12 | 15 | 11 |
| 13 | 3 | 10 |
| 14 | 14 | 11 |
| 15 | 14 | 11 |
| 16 | 2 | 10 |
| 17 | 15 | 11 |
| 18 | 2 | 11 |
| 19 | 2 | 10 |
| 20 | 6 | 1011 |
| 21 | 15 | 11 |
| 22 | 4 | 1010 |
| 23 | 4 | 1011 |
| 24 | 2 | 11 |
| 25 | 2 | 11 |
| 26 | 4 | 10 |
| 27 | 16 | 11 |
| 28 | 15 | 11 |
| 29 | 4 | 10 |
| 30 | 5 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 31 | 3 | 10 |
| 32 | 4 | 1110 |
| 33 | 4 | 1111 |
| 34 | 3 | 10 |
| 35 | 3 | 10 |
| 36 | 3 | 11 |
| 37 | 5 | 1010 |
| 38 | 3 | 10 |
| 39 | 3 | 11 |
| 40 | 5 | 1011 |
| 41 | 14 | 11 |
| 42 | 2 | 11 |
| 43 | 3 | 10 |
| 44 | 3 | 1010 |
| 45 | 3 | 1011 |
| 46 | 10 | 1011 |
| 47 | 23 | 10 |
| 48 | | |
| 49 | 3 | 1011 |
| 50 | 5 | 1011 |
| 51 | 14 | 11 |
| 52 | 2 | 11 |
| 53 | 3 | 10 |
| 54 | 3 | 1110 |
| 55 | 3 | 1111 |
| 56 | 21 | 11 |
| 57 | 53 | 1110 |
| 58 | 26 | 11 |
| 59 | 3 | 1111 |
| 60 | 4 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 61 | 2 | 10 |
| 62 | 4 | 10 |
| 63 | 3 | 11 |
| 64 | 12 | 11 |
| 65 | 7 | 1110 |
| 66 | 4 | 1111 |
| 67 | 98 | 11 |
| 68 | 15 | 1010 |
| 69 | 7 | 1110 |
| 70 | 4 | 10 |
| 71 | 15 | 11 |
| 72 | 16 | 11 |
| 73 | 5 | 1010 |
| 74 | 23 | 11 |
| 75 | 203 | 10 |
| 76 | 8 | 10 |
| 77 | 4 | 10111011 |
| 78 | 18 | 11 |
| 79 | 145 | 11 |
| 80 | 2 | 10 |
| 81 | 2 | 11 |
| 82 | 15 | 11 |
| 83 | 3 | 10 |
| 84 | | |
| 85 | 39 | 10 |
| 86 | 10 | 10 |
| 87 | 10 | 1011 |
| 88 | 13 | 1111 |
| 89 | 16 | 11 |
| 90 | 4 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 91 | 2 | 10 |
| 92 | 4 | 10 |
| 93 | 3 | 11 |
| 94 | 3 | 1110 |
| 95 | 3 | 1111 |
| 96 | 21 | 11 |
| 97 | 49 | 11 |
| 98 | 18 | 10 |
| 99 | 3 | 1111 |
| 100 | 2 | 1 |
| 101 | 5 | 10 |
| 102 | 4 | 11 |
| 103 | 2 | 10 |
| 104 | 4 | 11 |
| 105 | 32 | 11 |
| 106 | 11 | 1011 |
| 107 | 15 | 11 |
| 108 | 15 | 11 |
| 109 | 19 | 11 |
| 110 | 5 | 10 |
| 111 | 5 | 11 |
| 112 | 5 | 11 |
| 113 | 2 | 11 |
| 114 | 18 | 11 |
| 115 | 41 | 11 |
| 116 | 20 | 11 |
| 117 | 5 | 11 |
| 118 | 5 | 11 |
| 119 | 7 | 10 |
| 120 | 4 | 11 |

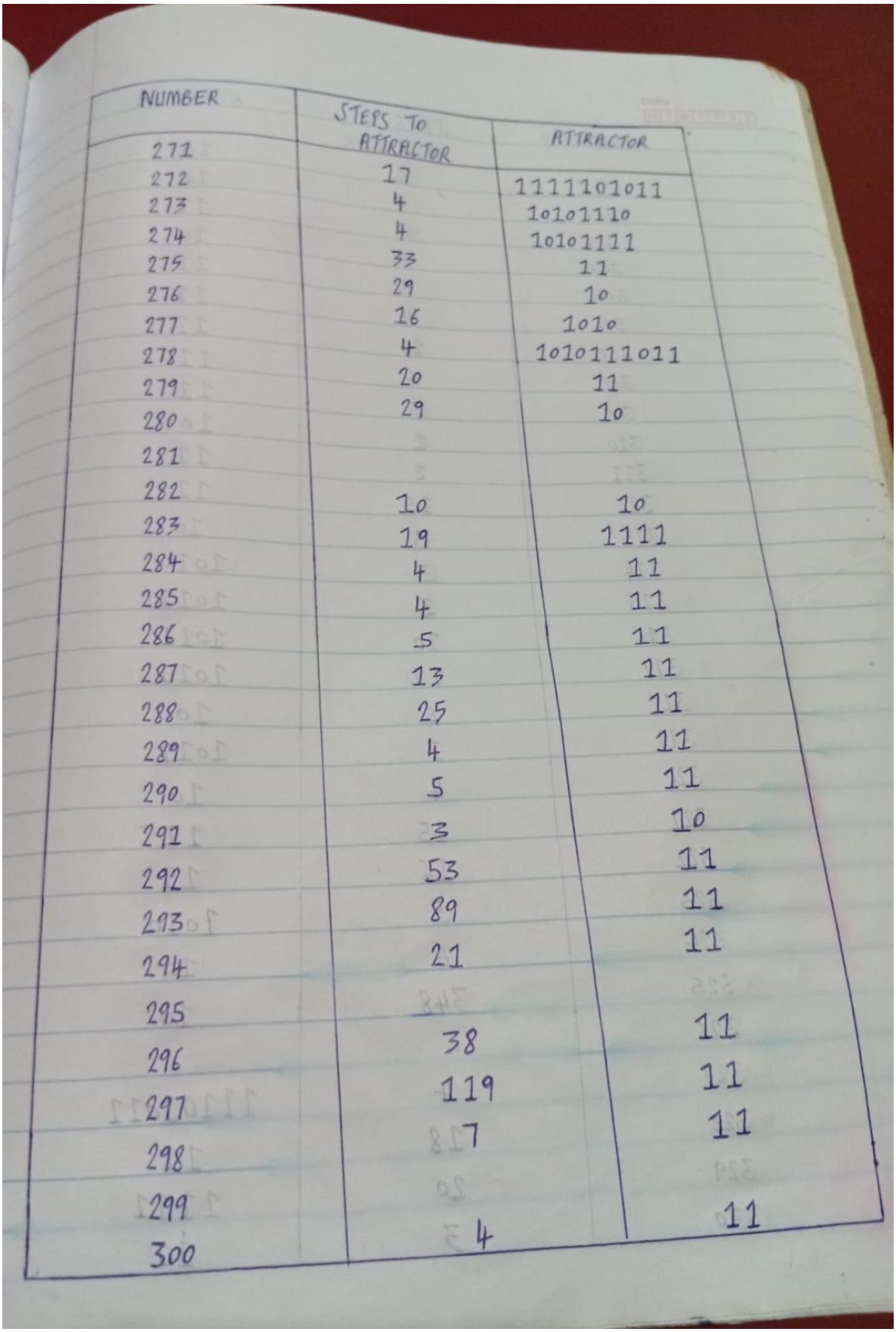
| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 121 | 5 | 11 |
| 122 | 4 | 11 |
| 123 | 15 | 11 |
| 124 | 5 | 11 |
| 125 | 3 | 10 |
| 126 | 17 | 11 |
| 127 | 68 | 11 |
| 128 | | |
| 129 | 3 | 10 |
| 130 | 2 | 10 |
| 131 | 2 | 11 |
| 132 | 15 | 11 |
| 133 | 3 | 10 |
| 134 | 3 | 1010 |
| 135 | 3 | 1011 |
| 136 | 10 | 1011 |
| 137 | 11 | 1011 |
| 138 | 6 | 10 |
| 139 | 3 | 1011 |
| 140 | 4 | 11 |
| 141 | 4 | 1110 |
| 142 | 5 | 11 |
| 143 | 3 | 11 |
| 144 | 6 | 11 |
| 145 | 21 | 11 |
| 146 | 12 | 1110 |
| 147 | 25 | 11 |
| 148 | 51 | 1111 |
| 149 | 42 | 10 |
| 150 | 56 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 151 | 51 | 10 |
| 152 | 3 | 10 |
| 153 | 17 | 11 |
| 154 | 19 | 11 |
| 155 | | |
| 156 | 26 | 11 |
| 157 | 10 | 11 |
| 158 | 6 | 10 |
| 159 | 393 | 10 |
| 160 | | |
| 161 | 20 | 11 |
| 162 | 5 | 1010 |
| 163 | 199 | 10 |
| 164 | 48 | 11 |
| 165 | 17 | 11 |
| 166 | 21 | 10 |
| 167 | 19 | 1111 |
| 168 | 28 | 11 |
| 169 | 79 | 11 |
| 170 | 18 | 11 |
| 171 | 5 | 11 |
| 172 | 68 | 11 |
| 173 | 6 | 11 |
| 174 | 74 | 11 |
| 175 | 59 | 1110 |
| 176 | 130 | 10 |
| 177 | 32 | 11 |
| 178 | 8 | 10 |
| 179 | 18 | 11 |
| 180 | 15 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 181 | 5 | 11 |
| 182 | 23 | 10 |
| 183 | | |
| 184 | 9 | 1011 |
| 185 | 15 | 11 |
| 186 | | |
| 187 | 4 | 11 |
| 188 | 6 | 10 |
| 189 | 11 | 11 |
| 190 | 6 | 1110 |
| 191 | 3 | 10 |
| 192 | 3 | 1110 |
| 193 | 15 | 10 |
| 194 | 23 | 1111 |
| 195 | 13 | 11 |
| 196 | 16 | 11 |
| 197 | 8 | 10 |
| 198 | 401 | 11 |
| 199 | 4 | 10 |
| 200 | 4 | 11 |
| 201 | 14 | 11 |
| 202 | 4 | 10 |
| 203 | 15 | 11 |
| 204 | 5 | 11 |
| 205 | 4 | 10 |
| 206 | 49 | 11 |
| 207 | | |
| 208 | 5 | 11 |
| 209 | 4 | 11 |
| 210 | | |

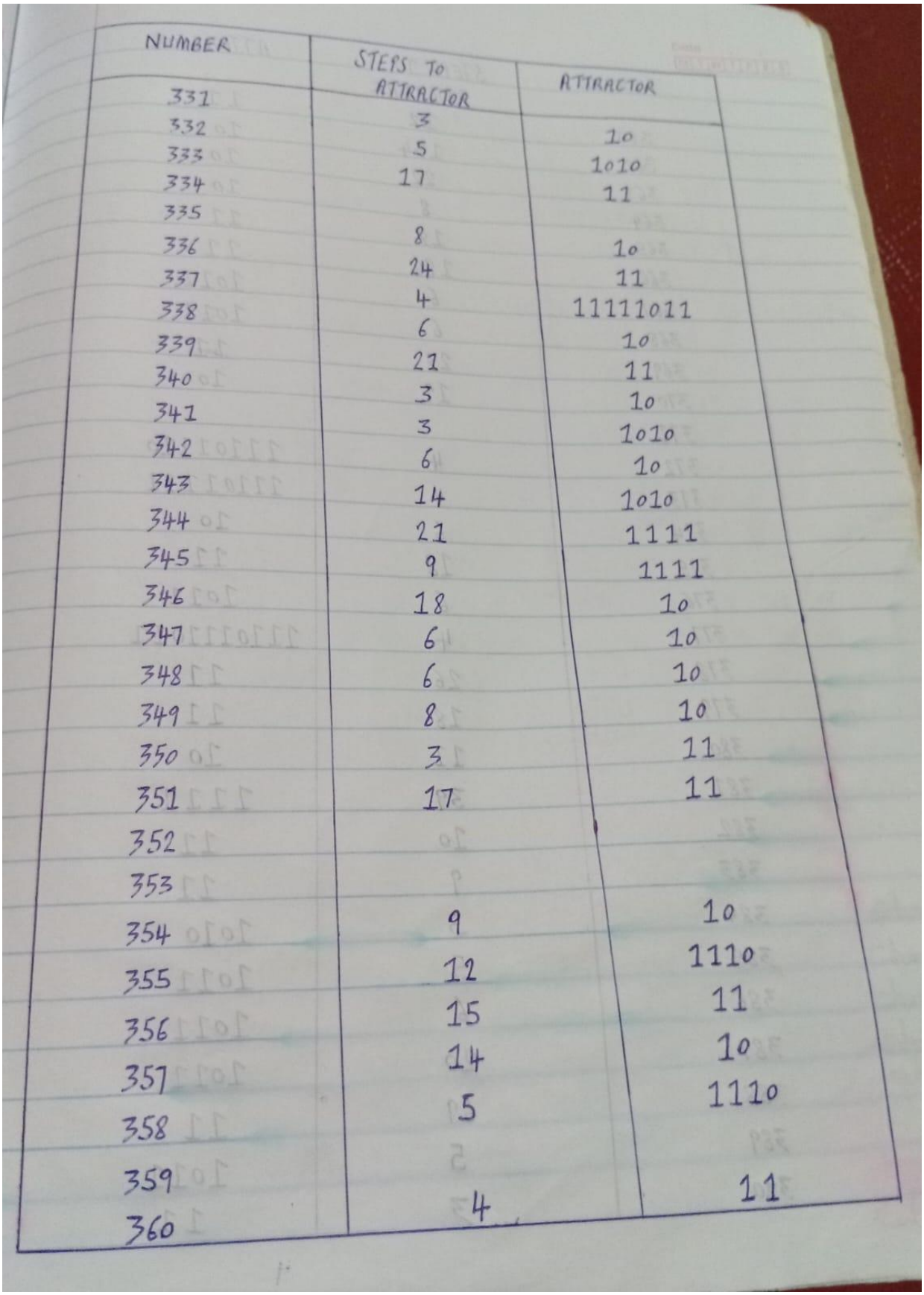
| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 211 | 5 | 11 |
| 212 | 4 | 11 |
| 213 | 15 | 11 |
| 214 | 5 | 11 |
| 215 | 3 | 10 |
| 216 | 17 | 11 |
| 217 | 59 | 11 |
| 218 | | |
| 219 | 3 | 10 |
| 220 | 14 | 11 |
| 221 | 4 | 11 |
| 222 | 16 | 11 |
| 223 | 16 | 11 |
| 224 | | |
| 225 | 8 | 10 |
| 226 | 37 | 10 |
| 227 | 4 | 10101011 |
| 228 | 18 | 11 |
| 229 | 6 | 1110111 |
| 230 | 4 | 10 |
| 231 | 15 | 11 |
| 232 | 16 | 11 |
| 233 | 5 | 1010 |
| 234 | 23 | 11 |
| 235 | 203 | 10 |
| 236 | 8 | 10 |
| 237 | 4 | 10111011 |
| 238 | 18 | 11 |
| 239 | 145 | 11 |
| 240 | 18 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 241 | 5 | 11 |
| 242 | 17 | 11 |
| 243 | | |
| 244 | 9 | 1011 |
| 245 | 15 | 11 |
| 246 | 32 | 11 |
| 247 | 8 | 10 |
| 248 | 23 | 10 |
| 249 | 5 | 11 |
| 250 | 3 | 10 |
| 251 | 13 | 11 |
| 252 | | |
| 253 | 9 | 10 |
| 254 | 24 | 11 |
| 255 | | |
| 256 | | |
| 257 | 5 | 10 |
| 258 | 39 | 11 |
| 259 | 4 | 10 |
| 260 | 5 | 11 |
| 261 | 260 | 11 |
| 262 | | |
| 263 | 11 | 10111011 |
| 264 | | |
| 265 | 512 | 10 |
| 266 | 12 | 10 |
| 267 | 12 | 10 |
| 268 | 48 | 10 |
| 269 | 36 | 1110 |
| 270 | | |



| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 271 | 17 | 1111101011 |
| 272 | 4 | 10101110 |
| 273 | 4 | 10101111 |
| 274 | 33 | 11 |
| 275 | 29 | 10 |
| 276 | 16 | 1010 |
| 277 | 4 | 1010111011 |
| 278 | 20 | 11 |
| 279 | 29 | 10 |
| 280 | | |
| 281 | | |
| 282 | 10 | 10 |
| 283 | 19 | 1111 |
| 284 | 4 | 11 |
| 285 | 4 | 11 |
| 286 | 5 | 11 |
| 287 | 13 | 11 |
| 288 | 25 | 11 |
| 289 | 4 | 11 |
| 290 | 5 | 11 |
| 291 | 3 | 10 |
| 292 | 53 | 11 |
| 293 | 89 | 11 |
| 294 | 21 | 11 |
| 295 | | |
| 296 | 38 | 11 |
| 297 | 119 | 11 |
| 298 | 17 | 11 |
| 299 | | |
| 300 | 4 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 302 | 2 | 10 |
| 302 | 4 | 10 |
| 303 | 3 | 11 |
| 304 | 3 | 10 |
| 305 | 3 | 11 |
| 306 | 4 | 11 |
| 307 | 24 | 11 |
| 308 | 6 | 11 |
| 309 | 3 | 11 |
| 310 | 2 | 10 |
| 311 | 2 | 11 |
| 312 | 15 | 11 |
| 313 | 3 | 10 |
| 314 | 3 | 1010 |
| 315 | 3 | 1011 |
| 316 | 10 | 1011 |
| 317 | 11 | 1011 |
| 318 | 6 | 10 |
| 319 | 3 | 1011 |
| 320 | 4 | 10 |
| 321 | 15 | 11 |
| 322 | 16 | 11 |
| 323 | 5 | 1010 |
| 324 | 6 | 10 |
| 325 | 348 | 10 |
| 326 | | |
| 327 | 4 | 11101011 |
| 328 | 18 | 11 |
| 329 | 20 | 1111 |
| 330 | 3 | 11 |



| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 331 | 3 | 10 |
| 332 | 5 | 1010 |
| 333 | 17 | 11 |
| 334 | | |
| 335 | 8 | 10 |
| 336 | 24 | 11 |
| 337 | 4 | 11111011 |
| 338 | 6 | 10 |
| 339 | 21 | 11 |
| 340 | 3 | 10 |
| 341 | 3 | 1010 |
| 342 | 6 | 10 |
| 343 | 14 | 1010 |
| 344 | 21 | 1111 |
| 345 | 9 | 1111 |
| 346 | 18 | 10 |
| 347 | 6 | 10 |
| 348 | 6 | 10 |
| 349 | 8 | 10 |
| 350 | 3 | 11 |
| 351 | 17 | 11 |
| 352 | | |
| 353 | | |
| 354 | 9 | 10 |
| 355 | 12 | 1110 |
| 356 | 15 | 11 |
| 357 | 14 | 10 |
| 358 | 5 | 1110 |
| 359 | | |
| 360 | 4 | 11 |

| NUMBER | STEPS TO ATTRACTOR | ATTRACTOR |
|---|---|---|
| 361 | 12 | 11 |
| 362 | 134 | 10 |
| 363 | 22 | 10 |
| 364 | 8 | 10 |
| 365 | 18 | 11 |
| 366 | 186 | 11 |
| 367 | 6 | 1011 |
| 368 | 6 | 1011 |
| 369 | 23 | 11 |
| 370 | 19 | 10 |
| 371 | 4 | 11101110 |
| 372 | 4 | 11101111 |
| 373 | 6 | 10 |
| 374 | 18 | 11 |
| 375 | 6 | 1011 |
| 376 | 4 | 1110111011 |
| 377 | 26 | 11 |
| 378 | 18 | 11 |
| 379 | 11 | 10 |
| 380 | 39 | 1111 |
| 381 | 10 | 11 |
| 382 | 9 | 11 |
| 383 | 5 | 1010 |
| 384 | 5 | 1011 |
| 385 | 6 | 1011 |
| 386 | 20 | 1011 |
| 387 | 69 | 11 |
| 388 | 5 | 1011 |
| 389 | 3 | 11 |
| 390 | | |

## 5.Real World Implications

### 5.1 Artificial Intelligence and Pattern Recognition

Each integer produces a unique trajectory that can be treated as a high dimensional feature vector. Machine learning algorithms can classify numbers by attractor basins, detect hidden structures or identify convergence patterns. This creates a new paradigm for integer-based feature extraction where deterministic chaos informs predictive modeling.

### 5.2 Pseudorandom Number Generation (PRNG)

The system produces gigantic intermediate sequences with high entropy. Controlled extraction of digits can yield long period, nonlinear pseudo random streams, deterministic yet unpredictable without full iteration. This property makes it ideal for simulation, stochastic modelling and cryptographically secure PRNGs.

### 5.3 Discrete Dynamical System Modelling

This system serves as a sandbox for studying deterministic chaos, basins of attraction and infinite attractors in discrete integer spaces. It can model iterative processes in population dynamics, resource growth or cascading systems providing insight into complex systems where growth and collapse coexist.

### 5.4 Educational and Research Tool

This system is highly visual and computationally tangible. It demonstrates chaos, stabilization and attraction structures in a manner that traditional integer problems cannot. Students and researchers can explore convergence patterns, explosive growth and fixed-point analysis directly through computation.

## Conclusion

This work introduces a novel class of digit based dynamical systems governed by iterative digit squaring and group of three compression which exhibits unprecedented explosive behavior coupled with multiple infinite attractors. Unlike classical systems such as Collatz or Kaprekar routines which either converge slowly or are constrained by fixed digit lengths, the system presented here demonstrates:

[1] Exponential digit growth in intermediate iterations producing states billions of times larger than initial inputs.

[2] Deterministic collapse to fixed points including 11, 10, 1011, 1010, 1110,1111 selective hyper ones, selective 1-zero-1 forms and other attractors establishing a new class of infinite attractors.

The system is fully deterministic yet explosively chaotic creating a digit universe simulator with properties not observed in prior integer iteration systems. Its combination of computational explosion and stabilization offers fertile ground for further research in integer dynamics, number theory and computational modelling.

This study lays the groundwork for future applications in pattern recognition, cryptography and mathematical experimentation while simultaneously challenging the current understanding of iterative integer systems. The results suggest a 21st century super Collatz, a system capable of demonstrating deterministic chaos on a scale far beyond classical analogues.

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[6] https://doi.org/10.5281/zenodo.18843564