MURMANSK ACADEMY OF CARTESIAN INFINITOLOGY
&
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THE A B C OF THE
M A T H E M A T I C A L
I N F I N I T O L O G Y

Introduction into the practical infinitology

Theory and practice of creating and graphical representation of the usual natural numbers and their seven main consequences in the rectangular system of Cartesian 2D & 2D* coordinates.

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Аннотация

В данной статье "Основы математической инфинитологии" кратко рассказано о тривиальном (некомпьютерном), но строго научном методе создания точечно - цветовых иллюстраций не только собственно натуральных чисел, но даже их комплексно - алгебраических эквивалентов в прямоугольной системе координат Декарта. Этот метод основан на переоткрытой автором этой статьи такой хорошо известной в математике идее, как "скатерть Улама", принадлежащей известному американскому математику Станиславу Мартину Уламу, выходцу из Польши.

Благодаря своему методу, автор смог научиться создавать графически, в прямоугольной системе координат Декарта, необычные математические шедевры в виде "портретов" обычных натуральных чисел и образуемых ими последовательностей не только вблизи начала этих координат, но и на любом расстоянии от этой точки.Такие графики открыли широкую дорогу для исследования самых сложных числовых последовательностей, среди которых последовательности натуральных простых чисел и чисел-близнецов. И, наконец, сама наука обрела долгожданное средство или инструмент познания и исследования декартовой или математической плюс-минус бесконечности (± ∞:xy & xyz) как реально существующей части или самостоятельного раздела элементарной теории чисел, арифметики, алгебры, высшей математики и ДИИ.

Ключевые слова: Математическая плюс-минус бесконечность(± ∞:xy & xyz),Декартова инфинитология, прямоугольная система координат Декарта, натуральные простые числа, точечно-одноцветный график натуральных простых чисел, Теория пробелов,"решето Эратосфена","скатерть Улама", обобщённая "скатерть Улама", комплексно-алгебраичесские аналоги.

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Abstract

In this Article,"The ABC of the mathematical infinitology", it is briefly but clearly told about the trivial (non-computer's) but the natural scientific method of creating the dot-colour illustrations of not only the natural numbers themselves but even their complex-algebraic analogies in 2D rectangular system of Cartesian coordinates. This method is based on the re-invented by this Article author the well-known in mathematics such an idea as "the Ulam's spieral", belonging to the famous American mathematician S.Ulam.

Thanks to own methods, the Author have studied to create graphically, in the 2D-2D* Cartesian coordinates, the unusual mathematical masterpieces in view of the "portraits" of the ordinal natural numbers and formed by them consequences not only in the vicinity of the "null-point" of these coordinates but at any distance from it. Such illustrations have opened the widen road for investigating the most complicated consequences where the prime and twins numbers are among them. And, at last, the Science has received the long- time-expected means or instrument for studying and investigation the Cartesian or mathematical infinity (± ∞: xy & xyz) as the really existing part and the independent division in the elementary Number theory, Arithmetic, Algebra, Higher mathematics & the Calculus with a lot of many other up-to-date sciences and their branches as well.

Key words: The Cartesian infinitology, the mathematical plus-minus infinity(± ∞:xy & xyz), the Cartesian coordinates, natural prime and twins numbers, the Theory of blank spaces, the "sieve of Erathosfen", "the Ulam's spieral", etc.

The ABC of the mathematical infinitology.

Principles of the modern theory and practice of scientific-and-mathematical infinitology.

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Abstract.

The modern Science has now a lot of its branches and meanders, where are working the numerous specialists and outstanding scientists everywhere in the whole world. The theme of this article is devoted to mathematics in general and to its such a new subsidiary science as the Cartesian infinitology ($\pm \infty$: x y & x y z) in a whole.

The young and adult modern people of our time, among them, in first turn, are such ones as the usual citizens, students or schoolchildren, have a very poor imagination about those achievements and successes that made by our scientists in the different parts and divisions of many fundamental sciences, especially in mathematics. This article is a short description of the numerous ideas of a new science that is named by its inventor as the mathematical infinitology.

The infinity as the scientific category is a very complicated conception and the difficult theme for professional discussing of its properties and features even by the academicians and the Nobelists as well. In spite of all problems, the author have found his own road to this Science and worked out independently, even not being a mathematician at all, the universal, from his point of view, and unusual theories and scientific methods, which helped him to find and name It as the mathematical infinitology, that may be now studied in rectangular system of Cartesian or other coordinates, in orthogonal ones, for example, as easy and practically as we study the organic chemistry or Chinese language at the middle school or in the University.

The mathematical infinitology, as a separate or independent science, has been never existed in the mathematics from the ancient times up to the 90-th years of the XX-th century. All outstanding mathematicians of the past times were able only approximately to image to themselves and explain to their colleagues and pupils in addition, what is an infinity indeed: the scientific abstraction or the natural mathematical science that can be not only tested by one’s tooth or touched by hands, but study and investigate it in schools or the Institutions of higher learning too.

In summer 1993, such a specific mathematical object as the “cloth of Ulam”, was occasionally re-invented by the article author without no one imagination, what it is indeed. Very long time working hours spent by the inventor with this mathematical toy or the simplest logical entertainment helped him to penetrate into the mysteries of this usual intellectual mathematical object and see in it the fantastic perspectives and possibilities as for science as for himself in further studying and it investigating. In a result of the own purposefulness and interests to the re-invented mathematical idea of the famous American mathematician S.M.Ulam, the new science was born in the World, and after long time experiments, it was named as the mathematical or Cartesian infinitology ($\pm \infty$: x y & x y z).

Introduction.

To my mother is devoted.

In any, praiseworthy hobby, business or the craft, being appeared at the human persons for a long time process of evolution, and thanks to the mental and creative abilities growth, sometimes among the advanced people were developed such high spheres of human knowledge or personal skills or intellectual abilities, that a lot of centuries and even the millenniums came or passed away, before some difficult scientific idea or the secrets of the craft could be at last found their final decisions or they were transformed by the human individuals into such form of the representation or embodiment, available for their natural perception by people, specialists or scientists, that a team of higher skilled experts could only recognize this or that decision as a perfect standard. And, it isn't necessary to go far very much for the examples! The most ancient and the unresolved task is a secret of natural prime numbers, the cornerstone of the scientific theory of their knowledge and studying was put by Eratosphen Kirensky, the Ancient Greece mathematician, being lived in the III century B.C. The knowledge by the human persons of the Great truths of the World, was always, from the time of immemorial destiny, the elite of possessing advanced thinkers being had a rich life experience. Such people- the unique just always were able and solved the various and most important tasks of their time, advancing thereby not only the era itself and its potential opportunities, but at the same time they were putting by own affairs and talents the progress and forward advance of Mankind on the evolution steps, un-looking on all difficulties and adversities of the daily occurrence, with their terrible wars, epidemics, personal problems and the natural cataclysms.

And here is already 21 century ! It is now improbably interesting to look backward to compare the life of people, which were living at the very beginning of our era, with today's life of people that are living now in 2013 A.D. The huge abyss between these two eras is more than evident. Everything was changed considerably and up to beyond recognition ! And though the different natural and technogenous misfortunes still annoy to people and their countries, the states and even the whole continents, but what, after all abundance, a huge variety of all forms, and views and types and everything in our civilization! The flights in space and the working Hadron collider became already our daily occurrence. And there is already a future man's struggle against the asteroid danger. And the Cheliabinsk fire-ball has showed to the whole world how terrible and dangerous can it be to all living beings on the Earth. It is the most convenient time to think about the security of the Mankind, and its planet too, from the space stone travelers already today. And at soon the possible flights of people to Mars, Venus and other planets of Solar system will be begun. And the wide development of new opportunities of the Arctic and Antarctica areas with their infinite store rooms of minerals and sea bio-sources, in the nearest future! And the problem of shortage of food and drinking water consumption !!! And the catastrophic climate surprises which provoke high-speed thawing of the ice armor of the Earth ! The life on the Earth became more unpredictable and dangerous. And in this very quickly changing world, it is difficult to the human person correctly and in due time to react to all misfortunes that are collapsing upon his head from the side of the natural disasters.

Being live rapidly and in the atmosphere of continuous changes, the modern human person, nevertheless, doesn't low his hands down and continues to create the material and intellectual treasures elsewhere on the Earth, and even in the outer space, making better, step by step, not only the created by him achievements but this very complicated World too, on the base of his own imperfections. The people constantly live in continuous creative search, solving the mass of tasks, for what they are sometimes encouraged morally or financially. For the sake of such bright perspectives of the personal wellbeing, the best minds start to look for the solution of the most difficult scientific tasks and other problems. And the valuable awards sometimes find the heroes! This work is a formal confirmation of the man's elementary inquisitiveness and how it helped him to made an interesting scientific invention in sphere of elementary mathematics.

The Ulam's cloth or spiral.

Even some a few people among the today's schoolchildren and students know and can convincingly, even on fingers, explain what it is the "Eratosphen's sieve" and / or the " Ulam's spiral", and at least to tell elementarily about these objects, and what it is spoken about in principle. And not all mathematician will be also able to explain objectively and clearly to the ordinary fans of this science, what it is a "bestia" named as the spiral of Ulam, and what are the concrete advantages from it to the science itself, to the ordinary fellow citizens and, especially, to the modern educated people of the world as well. If to judge on the single publications only, the mathematical idea of Mr.S.M.Ulam, the famous American mathematician and the Polish man in his original, is not be able to serve as a proof that our authors–educators and the legal distributors of the scientific-and-popular literature on mathematics among the population, have the elementary interest to this, in appearance, the childish mathematical occupation and these persons are not sure very much that they could be objectively and in details to tell for their readers, on the pages of the famous books, about the features of this idea. But what kind of the mathematical interest may have this a childish mathematical entertainment at readers in fact ?

As it is well known today, Stanislav M. Ulam has invented this "cloth", or rather, a spiral, in 1963, being presented once upon a time at a very boring meeting of his colleges-scientists. To kill time and not to fall asleep with boredom, our hero began to draw on the page of his note-book in cell a symbolic chessboard for solution of etudes, but, occasionally, he has changed his intention and, instead of the chess figures drawing, he begun to fill in the center of this, a poor similarity of the chessboard, with the natural prime numbers in view of the points situated in square cells of the spiral-typed line, turning anticlockwise, that replaced such prime numbers as two, three, etc. As for me, I have made the same even not being introduced with this idea at all and its author in general. Both Ulam and me have replaced the prime numbers with the points for simplification of the whole work. And at soon, the idea of the American mathematician, which was named as "the Ulam's cloth" by the scientists, was born and, by the time, it has possessed the right to live. Specialists of Los-Alamos laboratory, headed by Stanislav Martin Ulam, the author of this idea, did a huge work on detection the regularities of prime numbers distribution within this helicoid system, but the idea, as it is known, couldn't demonstrate itself in its entire beauty since it was needed a perfect modification a little. But just on this trifle, the time was absent at S.Ulam and his colleges. So it's a pity! Because Stanislav Martin Ulam and his friends in this laboratory have been on the threshold of the Great discovery in mathematics, and, as it is supposed by me, in sphere of the elementary number theory.

The spiral of Ulam

82	81	80	***79***	78	77	76	75	74	***73***
83	50	49	48	***47***	46	45	44	***43***	72
84	51	26	25	24	***23***	22	21	42	***71***
85	52	27	10	9	8	***7***	20	***41***	70
86	***53***	28	***11***	***2***	1	6	***19***	40	69
87	54	***29***	12	***3***	4	***5***	18	39	68
88	55	30	***13***	14	15	16	***17***	38	***67***
89	56	***31***	32	33	34	35	36	***37***	66
90	57	58	***59***	60	***61***	62	63	64	65
91	92	93	94	95	96	***97***	98	99	100…→ ∞

Even such a small site of mathematical object under the name "Ulam's cloth" allows to see the fine accurate chains of the natural numbers-points on the Fig. 1 - 3 below and in the [LI]

Classification of the natural numbers at the “spiral of Ulam”

I. 2, 3, 5, 7, 11, 13, 17, 19, 23, … --- the prime natural numbers;

II. 3-5, 5-7, 11-13, 29-31, 41-43, … --- twin numbers;

III. 1, 9, 25, 49, 81, 121, 169, … --- the squares of the odd natural numbers;

IV. 4, 16, 36, 64, 100, 144, 196, … --- the squares of the even natural numbers.

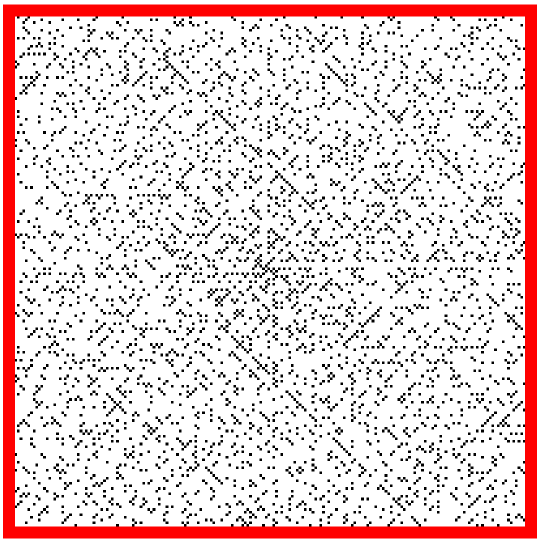

Fig. 1.

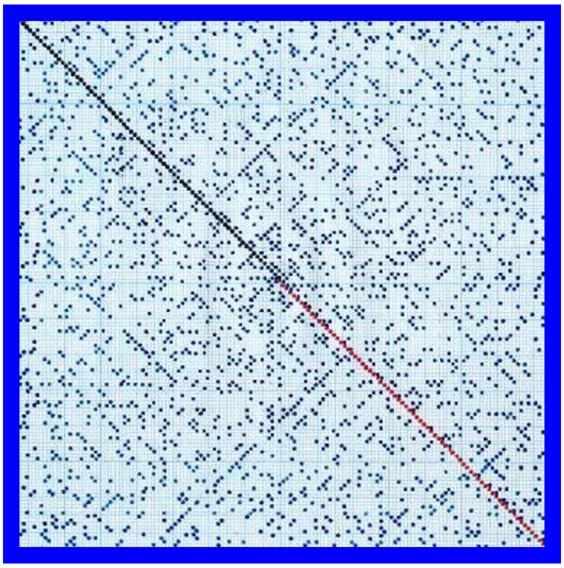

Fig. 2.

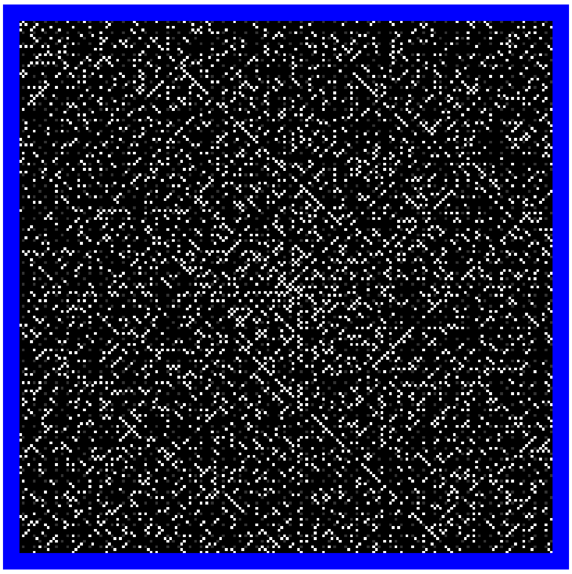

Fig. 3.

Fig. 1-3. The dotted interpretation of some “spiral of Ulam” verities.

The "Ulam's cloth" accurate chains of the natural numbers and their analogs in view of sets of the same dots on the different color fields (white, light-blue and black)) are demonstrating the verible variants of regularity of the natural number distribution in the spiral of Ulam.

But if to look at this peculiar roll from numbers indifferently, of course, it is nothing interesting will be found in this spiral. For those fifty years, which have passed from that day, when Stanislav Ulam has invented this "toy", who wasn't attracted only by it to check up one's intellect and satisfy one's vanity playing with this, in appearance, the usual ordinary numerical spiral! But nobody was able to see or understand its most important and basic features. May be this “cat in the bag” was “sitting” there up to the end of the times on a scientific shelf or in corner of the old store-room or a hose or rectangular "boa" rounded tightly and forgotten by everybody for ever, if once upon a time, exactly twenty years ago, the author of these lines also decided but occasionally to solve one simple arithmetic problem. In the course of its decision, when all known methods were tried without results, suddenly the entertainment of my student's years came to my mind---a mathematical rectangular spiral, which sometimes should be drawn by me at very boring lectures. In my student years during the boring lectures, I created the spiral of natural numbers and marked the natural prime numbers situated in cells of it, on the page of my student’s note-book exactly as it was made by Stanislav Ulam, (that I known much later, having looked through the mountains of mathematical literature). I have been already ready to end my empty occupations with this spiral. When I wanted to find the possible decision of my arithmetic task, when, at the last moment, I have noticed one strangeness, which strongly intrigued and surprised me: I noticed, that all squares of odd natural numbers at this spiral ideally correctly were situated on the diagonal leaving the center of this spiral and gone to the left corner, but the squares of even natural numbers---to the opposite side of the spiral [F2]. ..

And then a great willing has come to my mind --- to fulfill the graphical generalization of this elementary spiral. But to do so, one ought to me to make a huge volume of calculations and graphical works. And for the aim to receive a fine and interesting picture --- beautiful and demonstrated one ---, it has been decided to mark the suitable natural numbers with the dots of the corresponded color. In a result, the natural prime and twin numbers have been coded with the dots of blue-dark color, the squares of the odd natural numbers have become the green and the squares of the even natural numbers and the null too ---- the red ones. Such simple color coding or marking of the natural numbers have made the powerful and strong basement for a new scientific idea and the future new mathematical science. And later, after deep studying of it, this idea has been named as the “Generalized spiral of Ulam”. It is graphical interpretation is shown on the Fig. 2 [F2,4].

“Generalized spiral of Ulam”

82 **81** 80 **79** 78 77 76 75 74 **73**
83 50 **49** 48 **47** 46 45 44 **43** 72
84 51 26 **25** 24 **23** 22 21 42 **71**
85 52 27 10 **09** 08 0**7** 20 **41** 70
86 **53** 28 **11** **02** **01** 06 **19** 40 69
87 54 **29** 12 0**3** **04** 0**5** 18 39 68
88 55 30 **13** 14 15 **16** **17** 38 **67**
89 56 **31** 32 33 34 35 **36** **37** 66
90 57 58 **59** 60 **61** 62 63 **64** 65
91 92 93 94 95 96 **97** 98 99 **100**…→ ∞

Fig. 4-(2). Generalized spiral of Ulam

Analogs and derivations of the Generalized spiral of Ulam.

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At once and immediately, when was determined the main information about such a strange and even the mysterious scientific object as the spiral of Ulam, there were begun the longest searching of more detailed descriptions of such spiral in the suited editions, publications, and manuals on mathematics. But having reconsidered the hills of books and handbooks on the elementary and higher mathematics, I was not able to find the information about this neither the spiral nor the generalized analog of it. Having supposed that this idea has not even the elementary interest and attention at the mathematicians, I begun to study this “toy” independently, being made my own varieties of this spiral for differentiation of my own entertainment only. In a result of my interactivity, the most improbable compositions have begun to appear from the natural numbers, which, after replacement the natural numbers on the color dots, I have received their own names like these ones: triangular, trapeziform, zigzag, and so on. There are some types and kinds of such number compositions below, that have been created on the base of my big interest and my own version of the Generalized spiral of Ulam too.

					21					
				22	7	20				
			23	8	**1**	6	19			
		24	**9**	2	3	**4**	5	18		
	25	10	11	12	13	14	15	**16**	17	
26	27	28	29	30	31	32	33	34	35	**36**

Рис. 5. Triangular spiral. $\{A_n\} = n$

						50	**49**						
					51	26	**25**	48					
				52	27	10	**9**	24	47				
			53	28	11	2	**1**	8	23	46			
		54	29	12	3	**4**	5	6	7	22	45		
	55	30	13	14	15	**16**	17	18	19	20	21	44	
56	31	32	33	34	35	**36**	37	38	39	40	41	42	43

Рис. 6. Trapeziform spiral. $\{A_n\} = n$

109									
89	107								
71	87	105							
55	69	85	103						
41	53	67	83	**101**					
29	39	51	65	**81**	99				
19	27	37	**49**	63	79	97			
11	17	**25**	35	47	61	77	95		
05	**09**	15	23	33	45	59	75	93	
01	03	07	13	21	31	43	57	73	91

Рис. 7. Zigzag spiral. $\{A_n\} = 2n - 1$

																		99	**100**
																80	**81**	98	101
														63	**64**	79	82	97	103
												48	**49**	62	65	78	83	96	104
										35	**36**	47	50	61	66	77	84	95	105
								24	**25**	34	37	46	51	60	67	76	85	94	106
						15	**16**	23	26	33	38	45	52	59	68	75	86	93	107
				8	**9**	14	17	22	27	32	39	44	53	58	69	74	87	92	108
		3	**4**	7	10	13	18	21	28	31	40	43	54	57	70	73	88	91	109
0	**1**	2	5	6	11	12	19	20	29	30	41	42	55	56	71	72	89	90	110

Рис. 8. Serpentine spiral. {A_n} = n

223	221	219	217	215	213	211	209	207	205	203	201	199	197	195
225	143	145	147	149	151	153	155	157	159	161	163	165	167	193
227	141	119	117	115	113	111	109	107	105	103	101	99	**169**	191
229	139	**121**	63	65	67	69	71	73	75	77	79	97	171	189
231	137	123	61	47	45	43	41	39	37	35	**81**	95	173	187
233	135	125	59	**49**	15	17	19	21	23	33	83	93	175	185
235	133	127	57	51	13	7	5	3	**25**	31	85	91	177	183
237	131	129	55	53	11	**9**	0	**1**	27	29	87	89	179	181

Рис. 9. Funnel-shaped spiral. {A_n} = 2n - 1

																										90	
																										91	
											24		32				48	54		62			74		84	92	
											25		33				**49**	55		63			75		85	93	
						8		14		20	26		34	38		44	50	56		**64**	68		76	80	86	94	98
0						**9**		15		21	27		35	39		45	51	57		65	69		77	**81**	87	95	99
	1			**4**	6	10	12	**16**	18	22	28	30	**36**	40	42	46	52	58	60	66	70	72	78	82	88	96	**100**
		2	**3**	**5**	**7**	**11**	**13**	**17**	**19**	**23**	**29**	**31**	**37**	**41**	**43**	**47**	**53**	**59**	**61**	**67**	**71**	**73**	**79**	**83**	**89**	**97**	**101**

Fig. 10. A picture from the natural numbers, named as “The New-York silhouette”.(A_n} = n
(One of the numerous verities of the Generalized spiral of Ulam).

If to look attentively and carefully at the [F3-9] natural number compositions, we then will not be able to un-notice a new and very interesting feature --- the square powers of the odd and even natural numbers, as usual, have created again their special configurations and such a manner, that the noticed at the Generalized spiral of Ulam un-ordinal peculiarity to form their individual sets and subsets in view of the consequent chains of red and green dots, is nowhere broken in its new verities. Such a peculiarity is more persuasive than any words can say, that perhaps a new and nobody known property of usual natural numbers is found in mathematics. The further investigations of this property, discovered at the natural numbers, allowed to recognize it as the universal low at them and at their algebraic-and-complex equivalents as well, and it has been officially registered in the State notary office, in the Murmansk Regional town center, situated on Kola peninsula, in Russia.

Triangular structure.

When, as it was seemed, the all possible variants and varieties of the Generalized spiral of Ulam were invented and compiled, it is naturally the idea has appeared to create a new natural number configuration in view e.g. of pyramid or isosceles rectangular triangle, standing on one of its sides[F11]. In a new variant one more variety of the Generalized spiral of Ulam, it suddenly has been discovered that the spiral of Ulam, written in such a manner, is principally differ from its previous variants on the external view and other parameters (i.e. red and green dots had other configurations at the schematic diagram). In this triangular structure were seen clearly the counters of the famous and well-known to every one in mathematics the second order curve - the parabola itself.

01
02 03
04 05 06
07 08 **09** 10
11 12 13 14 15
16 17 18 19 20 21
22 23 24 **25** 26 27 28
29 30 31 32 33 34 35 **36**
37 38 39 40 41 42 43 44 45
46 47 48 **49** 50 51 52 53 54 55
56 57 58 59 60 61 62 63 **64** 65 66
67 68 69 70 71 72 73 74 75 76 77 78
79 80 **81** 82 83 84 85 86 87 88 89 90 91
92 93 94 95 96 97 98 99 **100** 101 102 103 104 105
106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136
137 138 139 140 141 142 143 **144** 145 146 147 148 149 150 151 152 153

Fig. 11 Triangular stepped structure. $\{A_n\} = n$

1
x x
4 x x
x x **9** x
x x x x x
16 x x x x x
x x x **25** x x x
x x x x x x x **36**
x x x x x x x x x
x x x **49** x x x x x x
x x x x x x x x **64** x x
x x x x x x x x x x x x
x x **81** x x x x x x x x x x
x x x x x x x x **100** x x x x x
x x x x x x x x x x x x x x x
121x x x x x x x x x x x x x x x
x x x x x x x **144** x x x x x x x x x x

Fig. 12. Triangular stepped structure. $\{A_n\} = n$

First most plot.

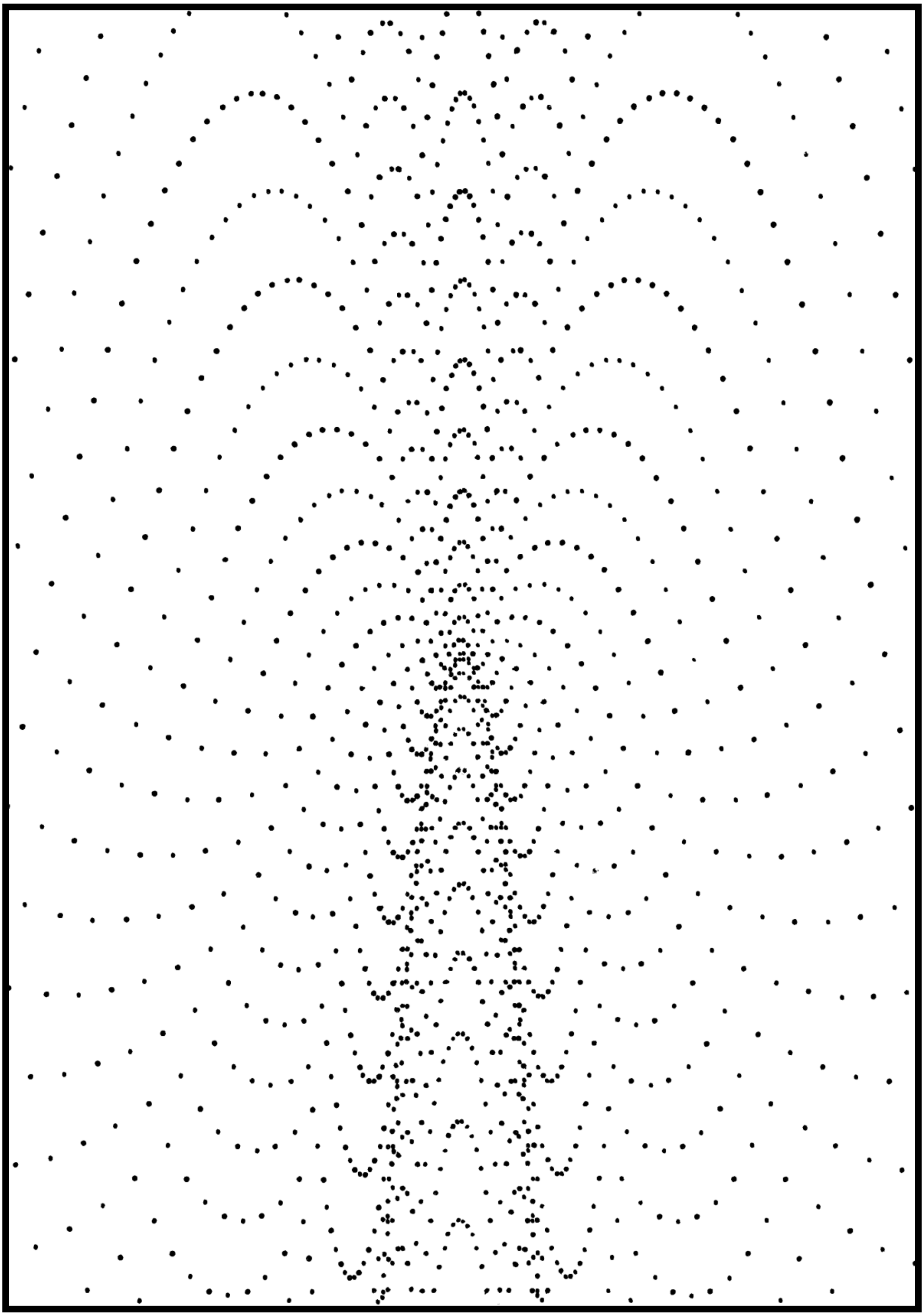


Fig.13. Fragment of the interminable dotted plot of the natural numbers [{A_n}={π^2}-type consequence in rectangular system of Cartesian coordinates.
(axes of coordinates are not shown conventionally)

Second plot

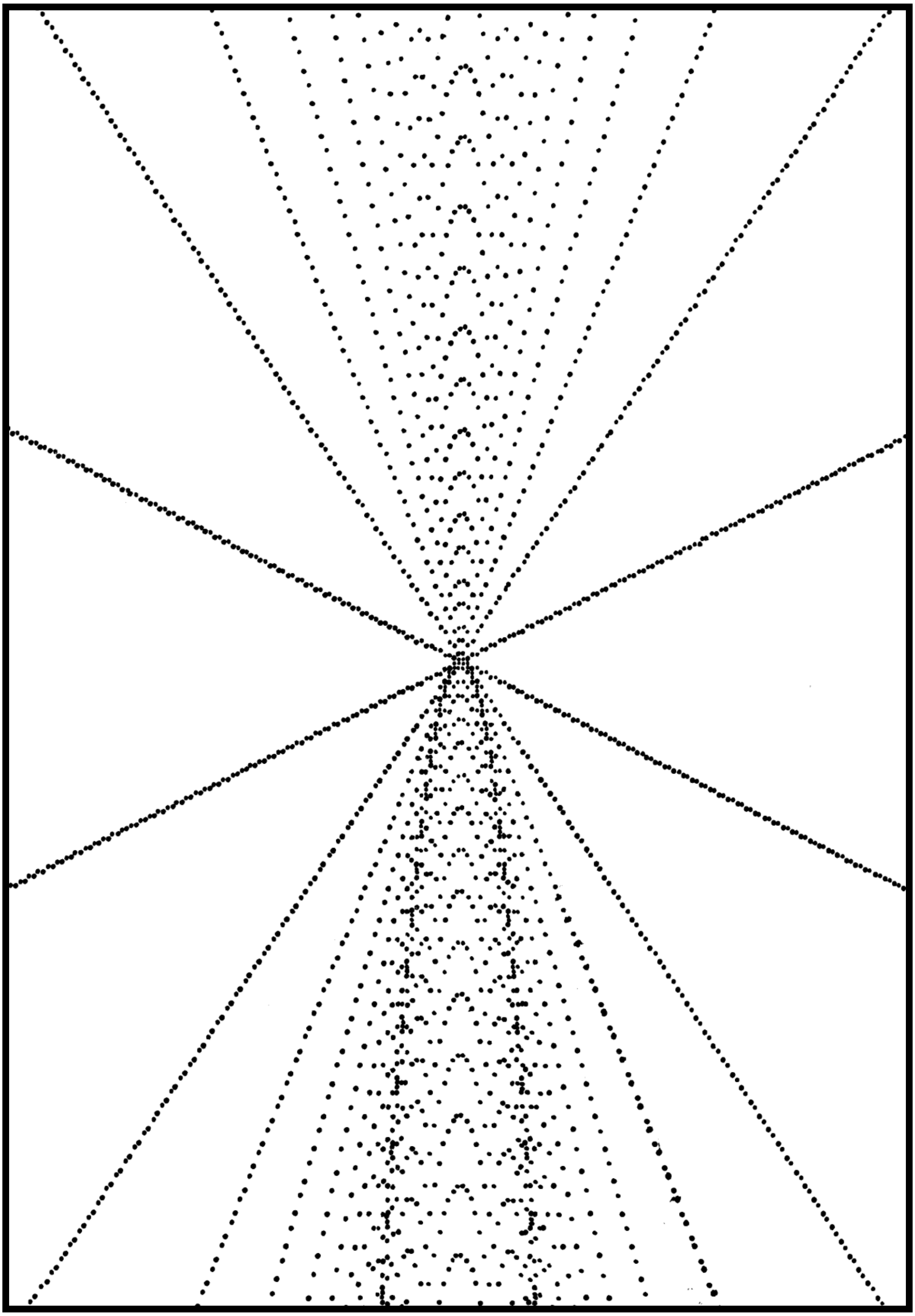


Fig.14. Fragment of the interminable dotted plot of the natural numbers

$\{A_n\}=\{[(2n-1)^2] \cup [(4n^2)]\}$ - type

consequence in rectangular system of Cartesian coordinates.

(axes of coordinates are not shown conventionally)

Third plot

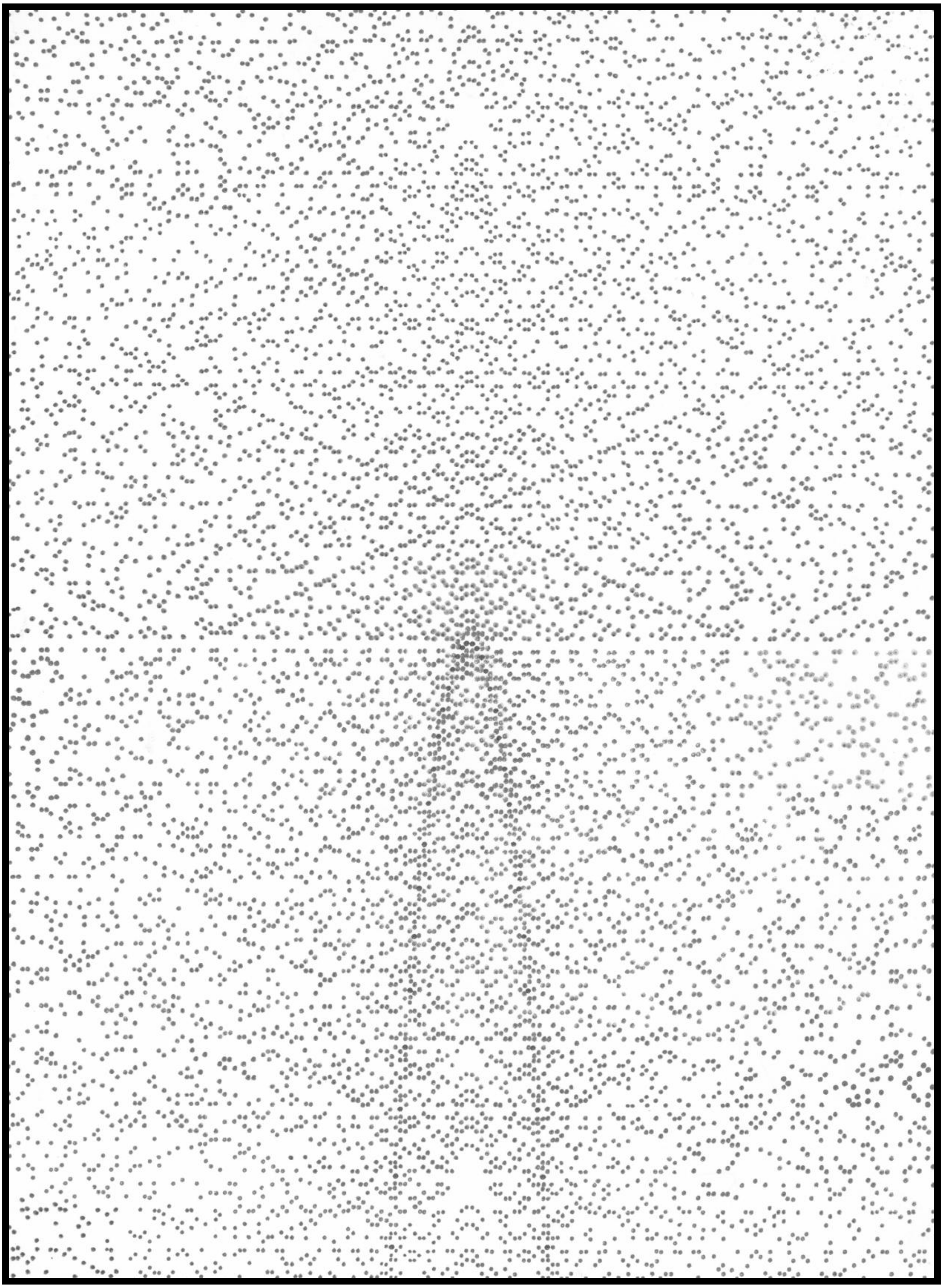


Fig.15. Fragment of the interminable dotted plot of the prime numbers [$\{A_n\}=\{\pi_n\}$] - type consequence in rectangular system of Cartesian coordinates.
(axes of coordinates are not shown conventionally)

Table of prime numbers from 2 up to 6203 (807).

2-3-5-7

11-13-17-19-23-29-31-37-41-43-47-53-59-61-67-71-73-79-83-89-97

101-103-107-109-113-127-131-137-139-149-151-157-163-167-173-179-181-191-193-197-199-211-223-227-229-233-239-241-251-257-263-269-271-177-281-283-293-307-311-313-317-331-337-347-349-353-359-367-373-379-383-389-397-401-409-419-421-431-433-439-443-449-457-461-463-467-479-487-491-499-503-509-521-523-541-547-557-563-569-571-577-587-593-599-601-607-613-617-619-631-641-643-647-653-659-661-673-677-683-691-701-709-719-727-733-739-743-751-757-761-769-773-787-797-809-811-821-823-827-829-839-853-857-859-863-877-881-883-887-903-911-919-929-937-941-947-953-967-971-977-983-991-997

1009-1013-1019-1021-1031-1033-1039-1049-1051-1061-1063-1069-1087-1091-1093-1097-1103-1109-1117-1123-1129-1151-1153-1163-1171-1181-1187-1193-1201-1213-1217-1223-1229-1231-1237-1249-1259-1277-1279-1283-1289-1291-1297-1301-1303-1307-1319-1321-1327-1361-1367-1373-1381-1399-1409-1423-1427-1429-1433-1439-1447-1451-1453-1459-1471-1481-1483-1487-1489-1493-1499-1511-1523-1531-1543-1549-1553-1559-1567-1571-1579-1583-1597-1601-1807-1609-1613-1619-1621-1627-1637-1657-1663-1667-1669-1693-1697-1699-1709-1721-1723-1733-1741-1747-1753-1759-1777-1783-1787-1789-1801-1811-1823-1831-1847-1861-1867-1871-1873-1877-1879-1889-1901-1907-1913-1931-1933-1949-1951-1973-1979-1987-1993-1997-1999-2003-2011-2017-2027-2027-2029-2039-2053-2063-2069-2081-2083-2087-2089-2099-2111-2113-2129-2131-2137-2141-2143-2153-2161-2179-2203-2207-2213-2221-2237-2239-2243-2251-2267-2269-2273-2281-2287-2293-2297-2309-2311-2333-2339-2341-2347-2351-2357-2371-2377-2381-2383-2389-2393-2399-2411-2417-2423-2437-2441-2447-2459-2467-2473-2477-2503-2521-2531-2539-2543-2549-2551-2557-2579-2591-2593-2609-2617-2621-2633-2647-2657-2659-2663-2671-2677-2683-2687-2689-2693-2699-2707-2711-2713-2719-2729-2731-2741-2749-2753-2767-2777-2789-2791-2797-2801-2803-2819-2833-2837-2843-2851-2857-2861-2879-2887-2897-2903-2909-2917-2927-2939-2953-2957-2963-2969-2971-2999-3001-3011-3019-3023-3037-3041-3049-3061-3067-3079-3083-3089-3109-3119-3121-3137-3163-3167-3169-3181-3187-3191-3203-3209-3217-3221-3229-3251-3253-3257-3259-3271-3299-3301-3307-3313-3319-3323-3329-3331-3343-3347-3359-3361-3371-3373-3389-3391-3407-3413-3433-3449-3457-3461-3463-3467-3469-3491-3499-3511-3517-3527-3529-3533-3539-3541-3547-3557-3559-3571-3581-3583-3593-3607-3613-3617-3623-3631-3637-3643-3659-3671-3673-3677-3691-3697-3701-3709-3719-3727-3733-3739-3761-3767-3769-3779-3793-3797-3803-3821-3823-3833-3847-3851-3853-3863-3877-3881-3889-3907-3911-3917-3919-3923-3929-3931-3943-3947-3967-3989-4001-4003-4007-4013-4019-4021-4027-4049-4051-4057-4073-4079-4091-4093-4099-4111-4127-4129-4133-4139-4153-4157-4159-4177-4201-4211-4217-4219-4229-4231-4241-4243-4253-4259-4261-4271-4273-4283-4289-4297-4327-4337-4339-4349-4357-4363-4373-4391-4397-4409-4421-4423-4441-4447-4451-4457-4463-4481-4483-4493-4507-4513-4517-4519-4523-4547-4549-4561-4567-4583-4591-4597-4603-4621-4637-4639-4643-4649-4651-4657-4663-4673-4679-4691-4703-4721-4723-4729-4733-4751-4759-4783-4787-4789-4793-4799-4801-4813-4817-4831-4861-4871-4877-4889-4903-4909-4919-4931-4933-4937-4943-4951-4957-4967-4969-4973-4987-4993-5003-5009-5011-5021-5023-5039-5051-5059-5077-5081-5087-5099-5101-5107-5113-5119-5147-5153-5167-5171-5179-5189-5197-5209-5227-5231-5233-5237-5261-5273-5279-5281-5297-5303-5309-5323-5333-5347-5351-5387-5393-5399-5407-5413-5417-5419-5431-5437-5441-5443-5449-5471-5477-5479-5483-5501-5503-5507-5519-5521-5527-5531-5557-5563-5569-5573-5581-5591-5623-5639-5641-5647-5651-5653-5657-5659-5669-5683-5689-5693-5701-5711-5717-5737-5741-5743-5749-5779-5783-5791-5801-5807-5813-5821-5827-5839-5843-5849-5851-5857-5861-5867-5869-5879-5881-5897-5903-5923-5927-5939-5953-5981-5987-6007-6011-6029-6037-6043-6047-6053-6067-6073-6079-6089-6091-6101-6113-6121-6131-6133-6143-6151-6163-6173-6197-6199-6203.

Graph-and-analytical method.

I - st variant

Let us write in common view the consequence of derivation of the second order line equation or the algebraic curve placed in Cartesian coordinates and going through the five coordinate points. When used with this method, one can calculate all types of polynomials and algebraic equations of all quadratic parabolas, the thin contours of which are formed by the sets of red, red-green and green dots on the plot [L1] of the natural numbers [$\{An\} = \{n^2\}$] - type consequence in the rectangular system of Cartesian coordinates.

The equation of the algebraic curve of the second order, that going through the five points : M_1 (x_1, y_1); M_2 (x_2, y_2); M_3 (x_3, y_3); M_4 (x_4, y_4) и M_5 (x_5, y_5), one can calculate it with the following method, that well-known in mathematics as the Method of determinants:

1. Let us write four determinants and their algebraic equalities:

M_1M_2: $$A(x, y) = \begin{vmatrix} x & y & 1 \\ x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \end{vmatrix} = 0$$

$$A(x, y) = xy_1 + x_2y + x_1y_2 - x_2y_1 - xy_2 - x_1y$$

M_2M_3: $$B(x, y) = \begin{vmatrix} x & y & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = 0$$

$$B(x, y) = xy_2 + x_3y + x_2y_3 - x_3y_2 - xy_3 - x_2y$$

M_3M_4: $$C(x, y) = \begin{vmatrix} x & y & 1 \\ x_3 & y_3 & 1 \\ x_4 & y_4 & 1 \end{vmatrix} = 0$$

$$C(x, y) = xy_3 + x_4y + x_3y_4 - x_4y_3 - xy_4 - x_3y$$

M_4M_1: $$D(x, y) = \begin{vmatrix} x & y & 1 \\ x_4 & y_4 & 1 \\ x_1 & y_1 & 1 \end{vmatrix} = 0$$

$$D(x, y) = xy_4 + x_1y + x_4y_1 - x_1y_4 - xy_1 - x_4y$$

2. Let us write the equation:

$$P \cdot A(x, y) \cdot C(x, y) + Q \cdot B(x, y) \cdot D(x, y) = 0, \qquad (1)$$

where P & Q – any real numbers that are not equal to zero simultaneously. Let us find such a relation of P & Q that M_5 has become to belong to the line (1).

$$P : Q = [(-B)(x_5, y_5) \cdot D(x_5, y_5)] : [A(x_5, y_5) \cdot C(x_5, y_5)] \qquad (2)$$

3. Let us find the meanings of P & Q and then insert these meanings in (1) and then we will try to decide this equation. After collecting like terms, we will have the algebraic equation of the second order line that going through the five known points.

4. In view of the practical example, let us calculate the equation of the second order line, the main points of which are situated in the negative area of the coordinate axis (–XoX+), having determined the meaning of coordinates of this curve with the help of the plot [L1], where we will find easily the first five green points of the furthest parabola, the symmetrical axis of which is parallel to the (–XoX+) coordinate line and combines with it.

$$M_1\,(-130\tfrac{1}{2};\,4\tfrac{1}{2});\;\; M_2\,(-126\tfrac{1}{2};\,3\tfrac{1}{2});\;\; M_3\,(-123\tfrac{1}{2};\,2\tfrac{1}{2});\;\; M_4\,(-121\tfrac{1}{2};\,1\tfrac{1}{2});$$
$$M_5\,(-120\tfrac{1}{2};\,\tfrac{1}{2})$$

5. Let us find the mediate equations and suited coefficients for derivation of the desired algebraic equation or the second order line, going through the five given points.

$$M_1M_2: \quad A(x, y) = \begin{vmatrix} x & y & 1 \\ (-261/2) & 9/2 & 1 \\ (-253/2) & 7/2 & 1 \end{vmatrix} = 0$$

$$A(x, y) = (9/2)x - (253/2)y - 1827/4 + 2277/4 - (7/2)x + (261/2)y$$

$$2x + 8y + 225 = 0$$

$$M_2M_3: \quad B(x, y) = \begin{vmatrix} x & y & 1 \\ (-253/2) & 7/2 & 1 \\ (-247/2) & 5/2 & 1 \end{vmatrix} = 0$$

$$B(x, y) = (7/2)x - (247/2)y - 1265/4 + 1729/4 - (5/2)x + (253/2)y$$

$$x + 3y + 116 = 0$$

$$M_3M_4: \quad C(x, y) = \begin{vmatrix} x & y & 1 \\ (-247/2) & 5/2 & 1 \\ (-243/2) & 3/2 & 1 \end{vmatrix} = 0$$

$$C(x, y) = (5/2)x - (243/2)y - 741/4 + 1215/4 - (3/2)x + (247/2)y$$

$$2x + 4y + 237 = 0$$

$$M_4M_1: \quad D(x, y) = \begin{vmatrix} x & y & 1 \\ (-243/2) & 3/2 & 1 \\ (-261/2) & 9/2 & 1 \end{vmatrix} = 0$$

$$D(x, y) = (3/2)x - (261/2)y - 2187/4 + 783/4 - (9/2)x + (243/2)y$$

$$6x + 18y + 702 = 0$$

6. Let us write the desired equation:

$$P\,(2x + 8y + 225)(2x + 4y + 237) + Q\,(x + 3y + 116)(6x + 18y + 702) = 0 \quad (3)$$

Let us find such a relation of P:Q that the $M_5(-120½;½)$ point became to belong to this line:

$x + 3y + 116 = 0$ $\qquad$ $(-241/2) + 3/2 + 232/2 = (-3)$

$6x + 18y + 702 = 0$ $\qquad$ $(-1446/2) + 18/2 + 1404/2 = (-12)$

$2x + 8y + 225 = 0$ $\qquad$ $(-241) + 4 + 225 = (-12)$

$2x + 4y + 237 = 0$ $\qquad$ $(-241) + 2 + 237 = (-2)$

$(P / Q) = [-(-3)(-12)] / [(-12)(-2)]$ $\qquad$ $(P / Q) = (-3) / 2$

$P = (-3)$ $\qquad$ $Q = 2$

7. Let us open the brackets in the equality (3) and then collect like terms with taking into account the meaning of the P & Q coefficients:

.

$$(-3)(2x + 8y + 225)(2x + 4y + 237)+2(x + 3y + 116)(6x + 18y + 702)=0$$

$$+\begin{cases} -12x^2 - 72xy - 2772x - 96y^2 - 8388 - 159975 = 0 \\ 12x^2 + 72xy + 2796x + 108y^2 + 8388 + 162864 = 0 \end{cases}$$

$$12\,y^2 + 24\,x + 2899 = 0 \qquad (4)$$

8. Let us determine the coordinates of M_0 top of the parabola (4). Let us $y_0 = 0$.

$12 \cdot 0 + 24x + 2889 = 0$ $\qquad$ $24x = -2889$

$x_0 = -120\,⅜$ $\qquad$ $y_0 = 0$

9. By turning the X and Y axes on (± 90º) and (±180°) around the null-point of the Cartesian coordinates, we then will have four main quadratic equations:

$$12y^2 \pm 24\,x + 2889 = 0 \qquad y = \pm\,(½\,x^2 + 120\,⅜\,)$$

Offered here calculation presents the famous method of determining the polynomials of those classical or created by the mathematical Nature of idea itself of the algebraic equations, the assemblage of coordinate points of which forms the interminable two-color dotted plot [L1] of the $\{A_n\}=\{n^2\}$- type natural numbers consequence in the rectangular system of Cartesian coordinates in the given scale and intervals alongside the X&Y axes and far from them on the unlimited fields of the rectangular system of Cartesian coordinates.

Graph-and-analytical method.

II - nd variant

The graph-and-analytic method of calculations of polynomials or algebraic equations on the five coordinate points, studied in the previous Chapter of this Article, is much more complicated and the academic one, and it requires a lot of time for derivation of the algebraic equation(s). Let us study the second and more easier variant of equation calculation or the derivation of the polynomial of the second order line. So, let us determine practically, from the graph, the coordinates of the parabola, formed with green dots [L1] and draw it in such a manner in the rectangular system of Cartesian coordinates as it is shown below and then we will begin to calculate the algebraic equation of this curve.

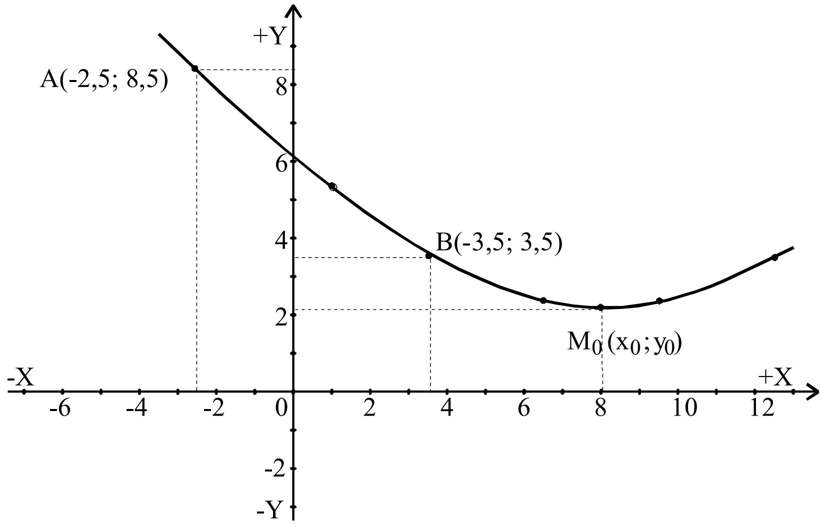


Fig. 16.

1. $y = ax^2 + bx + c$ $\qquad$ $M_0\ (x_0, y_0)$ – coordinates of parabola top. $\qquad$ (1)

2. $x_0 = [(-b) / (2a)]$ $\qquad$ $y_0 = (4ac - bI) / (4a)$.

3. $x_0 = (6.5 + 9.5) / 2$ $\qquad$ $x_0 = 8$ $\qquad$ $b = (-16a)$.

4. Let us insert the meanings of the coordinates of $A(-2.5; 8.5)$ in (1):

$8.5 = a(-2.5)^2 - 16a\ (-2.5) + c$

$8.5 = 6.25a + 40a + c$ $\qquad$ $c = 8.5 - 46.25a$.

5. Let us insert the meanings of the coordinates of $B(3.5; 3.5)$ in (1) :

$3.5 = 12.25a - 16a \cdot 3.5 + 8.5 - 46.25a$

$90a = 5$ $\qquad$ $a = 5 / 90$ $\qquad$ $a = 1 / 18$

6. Let us determine the meaning of b and c coefficients.

$b = (-16) \cdot 1/18$ $\qquad$ $b = (-8/9)$;

$c = 8.5 - 46.25a \cdot 1/18$ $\quad$ $c = 427/72$

7. Let us insert the found coefficient meanings in the equation (1):

$y = (1/18)x^2 – (8/9)x + 427/72$ $72y = 4x^2 – 64x + 427$

$4x^2 – 72y – 64x + 427 = 0$ – the calculated equation. (2)

8. Let us determine the meaning of the y_0 coordinate of the found parabola M_0 top that represents itself the third variety of the mathematical lines, born by this method in Cartesian coordinates:

$72y = 4 \cdot 64 – 64 \cdot 8 + 427$ $72y = 256 – 512 + 427$

$72y = 171$ $y = 2\,3/8$ $x_0 = 8$ $y_0 = 2\,3/8$.

9. Let us calculate the perfect square trinomial from the equation (2) and salve it rationally to the y:

$4x^2 – 72y – 64x + 427 = 0$ $72y = 4x^2 – 64x + 427$

$y = (1/18)x^2 – (8/9)x + 427/72$

$y = (1/18)(x^2 – 2 \cdot 8x + 64 – 64 + 472/4)$

$y = (1/18) [(x – 8)^2 + 171/4]$ – the calculated function.

10. Let us use the represented above method for determining the view of polynomial of the definite quadratic parabola, the visible thin counter of which is formed, for example, with a set of dots of the green color, and where the coordinates of the $M_0(x_0, y_0)$ parabola top are correspondently equal to $x_0 = 8$, $y_0 = –3\,5/8$, but the symmetrical axis is situated vertically:

$y = (1/18) [(x – 8)^2 – 65\,1/4]$. (3)

If this function will be salved rationally to the argument and then a minus sing will be written in front of the brackets, we then will have the suited equation of the calculated parabola curve, the symmetrical axis of which is situated horizontally:

$x = (–1) (1/18) [(y – 8)^2 – 65\,1/4]$

By usual turning the axis X or Y on (±90º) or (±180º) around the null-point of the Cartesian coordinates, we then will be able to have the eight main algebraic equations from the function (3) as well.

$4x^2$ -/+ $72y$ -/+ $64x – 5 = 0$, $4x^2$ -/+ $72y \pm 64x – 5 = 0$,

$4y^2$ -/+ $72x$ -/+ $64y – 5 = 0$, $4y^2$-/+ $72x \pm 64y – 5 = 0$,

that may be transformed into the different functions:

$y = \pm (1/18) [(x – 8)^2 – 65\,1/4]$, $x = \pm (1/18) [(y + 8)^2 – 65\,1/4]$,

$y = \pm (1/18) [(x + 8)^2 – 65\,1/4]$, $x = \pm (1/18) [(y – 8)^2 – 65\,1/4]$.

Universal Classifier of the natural numbers and its varieties.

For successful continuation of the natural numbers studying and investigation them in the limits of this idea, the necessity has suddenly appeared how to find or invent independently the universal and simplest method of the natural numbers classification. After very long and difficult seeks, it was invented at last such a numerical clepsydra or mathematical sieve that was able to characterize any natural number in view of its simplest parameters like these ones: evenness, oddness, simplicity, divisibility, etc. The universal mathematical natural numbers detector has been invented at last in the mathematical science.

In fact, the Universal classifier itself is a usual table in view of the right isosceles triangle that is widened to its horizontal side, and where the natural numbers are consequently roomed in cells from the point of their division on all possible whole devisors. It is the Universal classifier of the natural numbers that now allows to decide all simplest tasks on the any natural numbers parameterization. The Universal classifier itself and its varieties are placed below. When analyzing the Classifier structure and its principles of working, one can easily to see and understand the real Classifier's advantages in comparison with the analogical mathematical tables and schematic diagrams. It is a natural mini-mathematical Encyclopedia under ones hand.

In all times, there were people that tried to classify all and everything in the World. In a result, all people's achievements have begun to undergo to the common and the all-world classification. Each branch or direction of the human activity were analyzing by their pioneers or outstanding scientists. The Mankind, thanks to such clever persons, has possessed a dozen of sciences and their numerous meanders. All things, even the tiniest elements of them, have now their shelf, place or cell in the Great archives, created by the people. .

As for our ideas and methods of classification the rules and lows for creating the correct different dotted color illustrations, pictures and plots (graphs) in Cartesian coordinates, this science or mathematical infinitology requires the strong and ideal classification of all aspects and ideas in this huge scientific sphere. Having constructed the powerful base for such a complicated science like the mathematical infinitology, we must be sure that our system of rules, axioms, classifications and scientific imaginations, will be strong, and undestroyed for ever.

0																			
1	1																		
2	1	2																	
3	1	–	3																
4	1	2	–	4															
5	1	–	–	–	5														
6	1	2	3	–	–	6													
7	1	–	–	–	–	–	7												
8	1	2	–	4	–	–	–	8											
9	1	–	3	–	–	–	–	–	9										
10	1	2	–	–	5	–	–	–	–	10									
11	1	–	–	–	–	–	–	–	–	–	11								
12	1	2	3	4	–	6	–	–	–	–	–	12							
13	1	–	–	–	–	–	–	–	–	–	–	–	13						
14	1	2	–	–	–	–	7	–	–	–	–	–	–	14					
15	1	–	3	–	5	–	–	–	–	–	–	–	–	–	15				
16	1	2	–	4	–	–	–	8	–	–	–	–	–	–	–	16			
17	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	17		
18	1	2	3	–	–	6	–	–	9	–	–	–	–	–	–	–	–	18	
19	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19

Fig. 17.

```
0
2  1 2
4  1 2 – 4
6  1 2 3 – – 6
8  1 2 – 4 – – – 8
10 1 2 – – 5 – – – – 10
12 1 2 3 4 – 6 – – – – – 12
14 1 2 – – – – 7 – – – – – – 14
16 1 2 – 4 – – – 8 – – – – – – – 16
18 1 2 3 – – 6 – – 9 – – – – – – – – 18
20 1 2 – 4 5 – – – – 10 – – – – – – – – – 20
22 1 2 – – – – – – – – 11 – – – – – – – – – – 22
24 1 2 3 4 – 6 – 8 – – – 12 – – – – – – – – – – – 24
26 1 2 – – – – – – – – – – 13 – – – – – – – – – – – – 26
28 1 2 – – – – 7 – – – – – – 14 – – – – – – – – – – – – – 28
30 1 2 3 – 5 6 – – – 10 – – – – 15 – – – – – – – – – – – – – – 30
```

Fig. 18.

```
0
1  1
3  1 3
5  1 – 5
7  1 – – 7
9  1 3 – – 9
11 1 – – – – 11
13 1 – – – – – 13
15 1 3 5 – – – – 15
17 1 – – – – – – – 17
19 1 – – – – – – – – 19
21 1 3 – 7 – – – – – – 21
23 1 – – – – – – – – – – 23
25 1 – 5 – – – – – – – – – 25
27 1 3 – – 9 – – – – – – – – 27
29 1 – – – – – – – – – – – – – 29
31 1 – – – – – – – – – – – – – – 31
33 1 3 – – – 11 – – – – – – – – – – 33
35 1 – 5 7 – – – – – – – – – – – – – 35
```

Fig. 19.

00																		
01	01																	
03	01		03															
06	01	02	03			06												
09	01		03						09									
12	01	02	03	04		06						12						
15	01		03		05										15			
18	01	02	03			06			09								18	
21	01		03				07											21
24	01	02	03	04		06		08				12						
27	01		03						09									
30	01	02	03		05	06				10					15			
33	01		03								11							
36	01	02	03	04		06			09			12					18	
39	01		03										13					
42	01	02	03			06	07							14				21
45	01		03		05				09						15			
48	01	02	03	04		06		08				12				16		

Fig. 20.

Septenary low of number consequences.

For a long time, it is known in mathematics that the integers or the whole numbers are such numbers that form the interminable row of the calculated elements, each next one of them in this row is bigger than the previous number exactly on the unit, i.e. it is very well known to everybody the natural number consequence 1, 2, 3, 4, 5, 6, 7, etc. Let us name such a number [$\{A_n\} = n$] - type consequence, where the "n" is any integer or whole number that not equal to zero ($n \neq 0$), the Main number consequence, that is:

$$1, 2, 3, 4, 5, 6, 7, \ldots \text{etc.} \qquad \{A_n\} = n \qquad (1)$$

If, in such a number consequence (1), we will eliminate all odd natural numbers then we create the even numbers consequence, that is:

$$2, 4, 6, 8, 10, 12, \ldots \text{etc.} \qquad \{A_n\} = 2n \qquad (2)$$

If, in the Main number consequence (1), we save all odd natural numbers then we will have an odd numbers consequence in a result, that is:

$$1, 3, 5, 7, 9, 11, 13, \ldots \text{etc.} \qquad \{A_n\} = (2n - 1) \qquad (3)$$

If, in the Main number consequence (1), we save all prime numbers, we then will have the prime numbers consequence, that is:

$$2, 3, 5, 7, 11, 13, 17, 19, \ldots \text{ etc.} \qquad \{A_n\} = \pi_n \qquad (4)$$

If, we eliminate all prime numbers from the Main number consequence (1), we then will have a new variety of the Main number consequence, that is:

$$1, 4, 6, 8, 9, 10, 12, \ldots \text{ etc.} \qquad \{A_n\} = (n - \pi_n) \qquad (5)$$

If, we will form a number row from the natural numbers consisting of (2) and (3) consequences, we then will have a new number row, that is:

$$2, 3, 4, 5, 6, 7, 8, 9, \ldots \text{ etc.} \qquad \{A_n\} = (2n + \pi_n) \qquad (6)$$

If, the consequence (3) will be re-written without prime numbers, we then will have one more variety of the Main number consequence in a result, that is:

$$1, 9, 15, 21, 25, 27, 33, \ldots \text{etc.} \qquad \{A_n\} = [(2n - 1) - \pi_n] \qquad (7)$$

For equity sake, it is needed to note, that if the number row will be formed from the elements of the (3) and (4) number consequences, we then, formally, will have again a new number consequence, that is:

$$1, 2, 3, 5, 7, 9, 11, \ldots \text{ etc.} \qquad \{A_n\} = [(2n - 1) + \pi_n] \qquad (8)$$

It is more than evidence that the (8) number consequence presents itself as a consequence (3) with such a little difference that the number row (8) has the only "superfluous" element in view of "2", the absence of which will transform the number consequence (8) шto (3) one and, therefore, on the base of this idea, we can eliminate this (8) number consequence from our List when created the color dotted plots in the rectangular system of Cartesian coordinates on the base of the seven fundamental number consequences.

When resuming the above mentioned rules and ideas, one can say that using the elementary lows of logics and combinatorics, we have had in general seven fundamental number consequences, formed from the usual natural numbers. All other combinations of the natural numbers, existing now in mathematical science, is a result of the interactive work of the human casualties and, on the base of these circumstances, it is needed to recognize them as the derivations from the above mentioned seven natural number fundamental consequences. To such derivations, we can refer some number consequences, which are as follows:

1, 4, 9, 25, 36, 49, 64, ... etc. n^2, 1, 1, 2, 3, 5, 8, 13, etc … Fibonacci numbers,

1, 8, 27, 64, 125, 216, …etc. n^3, 3, 5, 7, 11, 13, 17, 19, etc. …twin numbers.

And, it is a lot of other number consequences that can present themselves as the different variations and analogs of the seven fundamental number consequences. When knowing the main elements of the seven fundamental number consequences, we can draw some kind of the Genealogical tree from such natural numbers to end at last all our talks and gossips for purpose of creating the visual interpretation of all our real, theoretical and virtual thinkings on the natural numbers theme.

“Genealogical Tree” of the Natural numbers

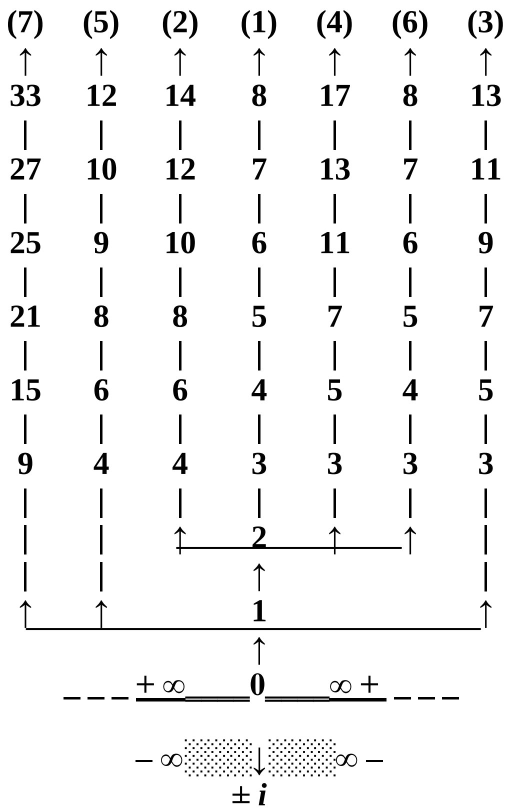


Fig. 21.

Septenary low of the natural numbers chromaticity coding.

After a successful creating of three dotted multi-colored graphs and plots in the rectangular system of Cartesian coordinates, the most unusual and interesting idea has born suddenly as “Eureka !” at Archimedes. It suddenly dawned upon me and the main result of such a premonition, presented here like the Classification table, was the idea of creating the dotted scientific illustration, the mathematical interpretation or close similarity to it would be a formula $\{A_n\} = \{n\}$, where the “n” is any natural number, marked in a view of the dot having the only possible color for this figure. But because of the absence of the axioms and the already written rules on the natural numbers color coding, this idea has taken me unawares, and I was needed, by all means, to find, invent or work out such method of natural number color coding at once, immediately and independently.

Later, in a result of the purposefulness and own interest, this difficult task was decided in the shortest time and much enough successfully. To be more specific, any natural number in the endless consequence of them, one can code (mark) now with the only color, and as for any figure color marking, it will be needed only seven “paints” of the rainbow spectrum for these purposes. The rules of color natural number coding is presented here in the Classification table below, taking, of course, in our mind, that each figure on the picture or a plot is represented there in a view of the suited color dot. Let us introduce with the elementary color coding rules of the natural numbers and their complex-and-algebraic equivalents as well. .

Classification Table

1. Any odd natural number, arisen in “( )^2” or any other “( )^2n” power, is coded in view of the green dot(s), e.g.: 1^2 = **1**, 3^2 = **9**, 5^2 = **25**, etc. The same but the negative odd numbers (-1, -9, -25, etc.) must be marked in such a manner, i.e. in view of the green dot(s) on the plot or graph, created in the Cartesian coordinates.

2. Any even natural number, arisen in “( )^2” or any other “( )^2n” power, is coded in view of the red dot(s), e.g.: 2^2 = **4,** 4^2 = **16,** 6^2 **= 36**, etc. The same but the negative even numbers (- 4, -16, - 36, etc.) must be marked in such a manner, i.e. in view of the red dot(s) on the plot or graph, created in the Cartesian coordinates.

3. Any natural prime or twin numbers must be coded in view of the blue dot(s), e.g.: 2 = **2**, 3 = **3**, 5 = **5**, etc. The same but the negative numbers (-2, -3, -5, etc.) must be marked in such a manner, i.e. in view of the blue dot(s) on the plot or graph, created in the Cartesian coordinates.

4. Any odd natural number, arisen in “( )^3” or any other “( )^(2n-1)” power, is coded in view of the dark blue dot(s), e.g.: 3^3 = **27**, 5^3 = **125**, 7^3 = **343**, etc. The same but the negative numbers (- 27, - 125, -343, etc.) must be marked in such a manner, i.e. in view of the dark blue dot(s) on the plot or graph, created in the Cartesian coordinates, excluding the natural (negative) numbers, which fall under the condition of the item No.1 of this Classification, e.g.: $9^3 = [(3^2)]^3$, etc.

5. Any even natural number, arisen in “( )^3” or any other “( )^(2n-1)” power, is coded in view of the violet dot(s), e.g.: 2^3 = **8**, 6^3 = **216**, 2^9 = **512**, etc. The same but the negative numbers(- 8, - 216,- 512, etc.)must be marked in such a manner, i.e. in view of the violet dot(s) on the plot or graph , created in the Cartesian coordinates, excluding the natural(negative) numbers, which fall under the condition of the item No. 2 of this Classification, e.g.: $4^3 = [(2^2)]^3$, etc.

6. All other odd natural (negative) numbers are coded in view of the yellow dot(s), e.g.:15, 21, 33, 35, 39, 45, 51, 55, etc., when created the plot or graph in Cartesian coordinates.

7. All other even natural (negative) numbers are coded in view of the orange dot(s), e.g.: 6, 10, 12, 14, 18, 20, 22, 24, etc., when created the plot or graph in Cartesian coordinates.

Such a simple method of any natural number color classification in a view of the dot, having the own color among the seven paints of the rainbow spectrum, will allow to create for us not only the most unusual scientific and art “pictures” but even the fantastic dotted illustrations and compositions in the rectangular system of Cartesian coordinates in the vicinity of its ”null”- point and at any distance from it. The modern programmable media products such ones of them as MAPLE, MathCAD, MATHEMATICA, MATLAB, WOLFRAM, etc., will help to strength the opportunities for our scientists-mathematicians and specialists in sphere of IBM PC programming up to the endless indeed.

And, probably, some new scientific inventions will be made as in mathematics as in physics, chemistry, astronomy and other famous sciences and their branches. And, may be, at last, the mathematical or Cartesian plus-minus infinity ($\pm \infty$: x y & x y z) will tell to its investigators all secrets of the prime numbers, twin numbers, proof the conjunction of B.Riemann and explain a lot of other outstanding scientific and mathematical problems of the past centuries and modern ones additionally.

Combinatorics:

Variants of color coding of natural numbers and formed by them consequences.

After working out the principles of natural numbers color coding in the limits of this idea, it has appeared the possibility to make and create as manually as electronically the most variable, dependent on their chromaticity and color compositing the dotted illustrations and pictures or scientific dotted - colored graphs of the natural numbers and formed by them consequences in the rectangular system of Cartesian coordinates.

One - color graphs

1. Green (gr) 2. Red (rd) 3. Blue (bl) 4. (c) Light blue (lb)

5. Violet (vt) 6. Yellow (yl) 7. Orange (rn)

C = 7! / [1! (7 – 1) !] C = 7

Two-color graphs

1. 1-2	2. 1-3	3. 1-4	4. 1-5	5. 1-6	6. 1-7	7. 2-3
8. 2-4	9. 2-5	10. 2-6	11. 2-7	12. 3-4	13. 3-5	14. 3-6
15. 3-7	16. 4-5	17. 4-6	18. 4-7	19. 5-6	20. 5-7	21. 6-7

C = 7! / [2! (7 – 2) !] C = 21

Three-color graphs

1. 1-2-3	2. 1-2-4	3. 1-2-5	4. 1-2-6	5. 1-2-7	6. 1-3-4	7. 1-3-5
8. 1-3-6	9. 1-3-7	10. 1-4-5	11. 1-4-6	12. 1-4-7	13. 1-5-6	14. 1-5-7
15. 1-6-7	16. 2-3-4	17. 2-3-5	18. 2-3-6	19. 2-3-7	20. 2-4-5	21. 2-4-6
22. 2-4-7	23. 2-5-6	24. 2-5-7	25. 2-6-7	26. 3-4-5	27. 3-4-6	28. 3-4-7
29. 3-5-6	30. 3-5-7	31. 3-6-7	32. 4-5-6	33. 4-5-7	34. 4-6-7	35. 5-6-7

C = 7 ! / [3! (7 – 3) !] C = 35

Four- color graphs

1. 1-2-3-4	2. 1-2-3-5	3. 1-2-3-6	4. 1-2-3-7
5. 1-2-4-5	6. 1-2-4-6	7. 1-2-4-7	8. 1-2-5-6
9. 1-2-5-7	10. 1-2-6-7	11. 1-3-4-5	12. 1-3-4-6
13. 1-3-4-7	14. 1-3-5-6	15. 1-3-5-7	16. 1-3-6-7
17. 1-4-5-6	18. 1-4-5-7	19. 1-4-6-7	20. 1-5-6-7
21. 2-3-4-5	22. 2-3-4-6	23. 2-3-4-7	24. 2-3-5-6
25. 2-3-5-7	26. 2-3-6-7	27. 2-4-5-6	28. 2-4-5-7
29. 2-4-6-7	30. 2-5-6-7	31. 3-4-5-6	32. 3-4-5-7
33. 3-4-6-7	34. 3-5-6-7	35. 4-5-6-7	36. 0-0-0-0

$$C = 7! / [\ 4!\ (7 - 4)!] \quad C = 35$$

Five-color graphs

1. 1-2-3-4-5	2. 1-2-3-4-6	3. 1 -2-3-4-7	4. 1-2-3-5-6
5. 1-2-3-5-7	6. 1-2-3-6-7	7. 1-2-4-5-6	8. 1-2-4-5-7
9. 1-2-4-6-7	10. 1-2-5-6-7	11. 1-3-4-5-6	12. 1-3-4-5-7
13. 1-3-4-6-7	14. 1-3-5-6-7	15. 1-4-5-6-7	16. 2-3-4-5-6
17. 2-3-4-5-7	18. 2-3-4-6-7	19. 2-3-5-6-7	20. 2-4-5-6-7
21. 3-4-5-6-7	22. 0-0-0-0-0	23. 0-0-0-0-0	24. 0-0-0-0-0

$$C = 7! / [\ 5!\ (7 - 5)!] \quad C = 21$$

Six-color graphs

1. 1-2-3-4-5-6	2. 1-2-3-4-5-7	3. 1-2-3-4-6-7	4.1-2-3-5-6-7
5. 1-2-4-5-6-7	6.1-3-4-5-6-7	7. 2-3-4-5-6-7	8. 0-0-0-0-0-0

$$C = 7! / [6!\ (7 - 6)!] \quad C = 7$$

Seven-color graphs

1. 1 - 2 - 3 - 4 - 5 - 6 -7

$$C = 7! / [\ 7!\ (7 - 7)!] \quad C = 1$$

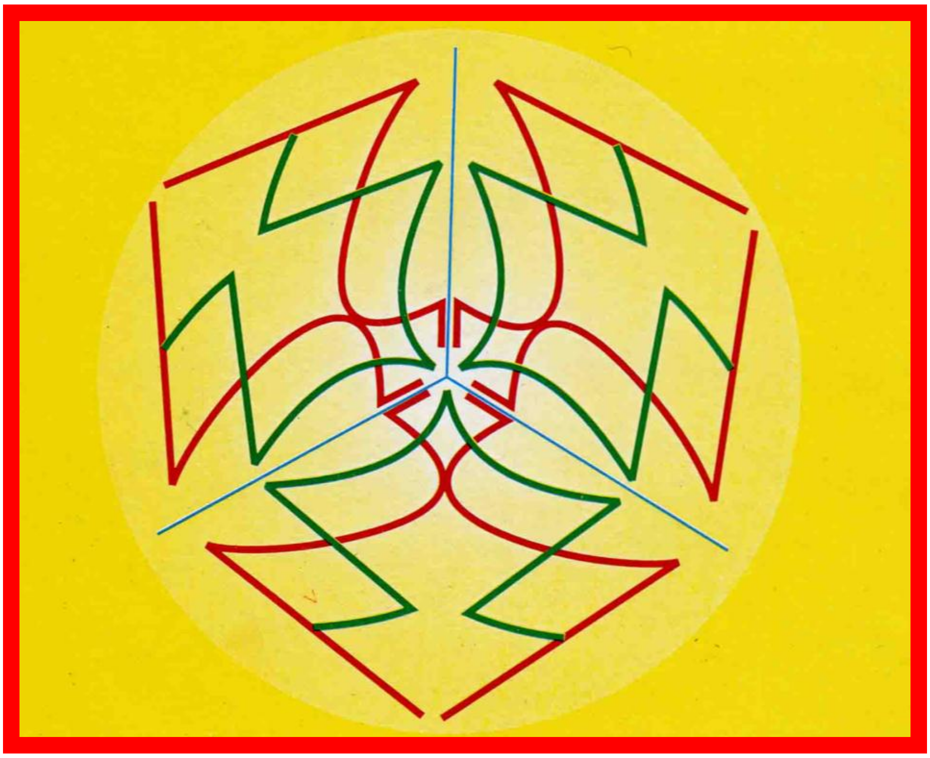
In a result of our elementary calculations with using the formulas, that well-known in combinatorics, we have received at last exactly 127 different compositions of the seven color-coded consequences of the natural numbers. Such a big quantity of combinations between the numbers and seven main colors allows to the makers of color illustrations “to draw” the natural mathematical Hermitage, consisting of the infinitely huge quantity of the scientific illustrations, borne by the theory of dot-color coding of the natural numbers on the immense spaces of the Cartesian or mathematical plus - minus infinity (± ∞: xy& xyz).

The universal schematic diagram of the natural numbers color composition

0.	**0**
1.	**1**
2.	**2-1-2**
3.	**3-1-3**
4.	**4-1-4**
5.	**5-1-5**
6.	**6-1-6**
7.	**7-1-7**
8.	**2**
9.	**3-2-3**
10.	**4-2-4**
11.	**5-2-5**
12.	**6-2-6**
13.	**7-2-7**
14.	**3**
15.	**4-3-4**
16.	**5-3-5**
17.	**6-3-6**
18.	**7-3-7**
19	**4**
20.	**5-4-5**
21.	**6-4-5**
22.	**7-4-7**
23.	**5**
24.	**6-5-6**
25.	**7-5-7**
26.	**6**
27.	**7-6-7**
28.	**7**
29.	**3-2-1-2-3**
30.	**4-2-1-2-4**
31.	**5-2-1-2-5**
32.	**6-2-1-2-6**
33.	**7-2-1-2-7**
34.	**4-3-1-3-4**
35.	**5-3-1-3-5**
36.	**6-3-1-3-6**
37.	**7-3-1-3-7**
38.	**5-4-1-4-5**
39.	**6-4-1-4-6**
40.	**7-4-1-4-7**
41.	**6-5-1-5-6**
42.	**7-5-1-5-7**
43.	**7-6-1-6-7**
44.	**4-3-2-3-4**
45.	**5-3-2-3-5**
46.	**6-3-2-3-6**
47.	**7-3-2-3-7**
48.	**5-4-2-4-5**
49.	**6-4-2-4-6**
50.	**7-4-2-4-7**

51.	6-5-2-5-6
52.	7-5-2-5-7
53.	7-6-2-6-7
54.	5-4-3-4-5
55.	6-4-3-4-6
56.	7-4-3-4-7
57.	6-5-3-5-6
58.	7-5-3-5-7
59.	7-6-3-6-7
60.	6-5-4-5-6
61.	7-5-4-5-7
62.	7-6-4-6-7
63.	7-6-5-6-7
64.	4-3-2-1-2-3-4
65.	5-3-2-1-2-3-5
66.	6-3-2-1-2-3-6
67.	7-3-2-1-2-3-7
68.	5-4-2-1-2-4-5
69.	6-4-2-1-2-4-6
70.	7-4-2-1-2-4-7
71.	6-5-2-1-2-5-6
72.	7-5-2-1-2-5-7
73.	7-6-2-1-2-6-7
74.	5-4-3-1-3-4-5
75.	6-4-3-1-3-4-6
76.	7-4-3-1-3-4-7
77.	6-5-3-1-3-5-6
78.	7-5-3-1-3-5-7
79.	7-6-3-1-3-6-7
80.	6-5-4-1-4-5-6
81.	7-5-4-1-4-5-7
82.	7-6-4-1-4-6-7
83.	7-6-5-1-5-6-7
84.	5-4-3-2-3-4-5
85.	6-4-3-2-3-4-6
86.	7-4-3-2-3-4-7
87.	6-5-3-2-3-5-6
88.	7-5-3-2-3-5-7
89.	7-6-3-2-3-6-7
90.	6-5-4-2-4-5-6
91.	7-6-4-2-4-5-7
92.	7-6-5-2-4-6-7
93.	7-6-5-2-5-6-7
94.	6-5-4-3-4-5-6
95.	7-5-4-3-4-5-7
96.	7-6-4-3-4-6-7
97.	7-6-5-3-5-6-7
98.	7-6-5-4-5-6-7
99.	5-4-3-2-1-2-3-4-5
100.	6-4-3-2-1-2-3-4-6
101.	7-4-3-2-1-2-3-4-7
102.	6-5-3-2-1-2-3-5-6

103.	**7-5-3-2-1-2-3-5-7**
104.	**7-6-3-2-1-2-3-6-7**
105.	**6-5-4-2-1-2-4-5-6**
106.	**7-5-4-2-1-2-4-5-7**
107.	**7-6-4-2-1-2-4-6-7**
108.	**7-6-5-2-1-2-5-6-7**
109.	**6-5-4-3-1-3-4-5-6**
110.	**7-5-4-3-1-3-4-5-7**
111.	**7-6-4-3-1-3-4-6-7**
112.	**7-6-5-3-1-3-5-6-7**
113.	**7-6-5-4-1-4-5-6-7**
114.	**6-5-4-3-2-3-4-5-6**
115.	**7-5-4-3-2-3-4-5-7**
116.	**7-6-4-3-2-3-4-6-7**
117.	**7-6-5-3-2-3-5-6-7**
118.	**7-6-5-4-2-4-5-6-7**
119.	**7-6-5-4-3-4-5-6-7**
120.	**6-5-4-3-2-1-2-3-4-5-6**
121.	**7-5-4-3-2-1-2-3-4-5-7**
122.	**7-6-4-3-2-1-2-3-4-6-7**
123	**7-6-5-3-2-1-2-3-5-6-7**
124	**7-6-5-4-2-1-2-4-5-6-7**
125.	**7-6-5-4-3-1-3-4-5-6-7**
126.	**7-6-5-4-3-2-3-4-5-6-7**
127.	**7-6-5-4-3-2-1-2-3-4-5-6-7**



Mathematical rose

Conclusion.

Represented here in this article a new scientific method of graphical visualization of the natural numbers and consequences, forming by them, in view of chains of the colored dotes and sets in 2D Cartesian coordinates became possible, when the Author of this article salved the nonstandard mathematical task, having united the “Ulam’s spieral” and own invention with the rectangular system of Cartesian coordinates. The bright and very impressive illustrations were appearing in a result, as if some one has correctly distributed the confetti on the surface of the magic field, and even their Inventor himself was surprised very much observe his “drawings”. Looking at my graphs and plots, the thought was born that no one in the World can create such “pictures” but Mr. Benoit B. Mandelbrot, the famous American mathematician, that used in his mathematical creativity the complex numbers, his own fantasy and the simplest IBC PC programmable media products as well. The results of Mandelbrot’s work are known to everybody, but new graphs and plots made by me are known to nobody to my big regret.

Many centuries ago, the French scientist R. Descartes has invented the method of representation the suited information in view of mathematical lines, curves and the schematic diagrams in a symbol net, where two lines were crossing under the angle of 90º forming a zero-point as the beginning of this system. But the most interesting illustrations in this system, named letter in honor of R. Descartes, were appearing when the mathematicians dissolved graphically the equations and different functional dependences like $y = x^2$, $y = x^3$ and a lot of others. Now, almost four century later from the invention of Cartesian coordinates system, this great idea of the French academician has become the first media in many sciences for decision of different mathematical tasks, that can now decide any educated person from the school pupils and ending the Nobel Prize laureates.

When the first natural numbers plots were crated by me in the Cartesian coordinates, it has been noticed that the investigated idea has relation not only to a method of studying the natural numbers and their complex-algebraic equivalents but, how strange it may be, to the mathematical or Cartesian plus-minus infinity, the perfect theory of its studying and representing is worked by no one scientists up to this day. The graphic-and analytic method of visualization of natural numbers presented in this article opens widely the doors and gates for all and any persons, who will introduce with the main principles of this idea. And everything that it is needed for this work --- the elementary interest to this new idea in mathematics. Thanks to this method, one can make in the rectangular system of Cartesian coordinates some beautiful color dotted “photo portrait” of any natural number, for example, 1, 2, 3, 5, 17. 35 etc., or the “picture” any, formed from them, consequence, such ones as the prime numbers, twin-numbers, Fibonacci numbers and etc.

In this article, special attention is paid to the specific rules and methods of calculation and creating the prime numbers graphs and other plots in Cartesian coordinates, having provided them preliminarily with a mathematical tables, where are listed all necessary information to create with their help the main mathematical “photos” of these consequences in the rectangular system of Cartesian coordinates. The method allows to make the same illustrations in axonometric projection when the three axis are under the angle of 120º to one another. It is also existing the method of programming the Cartesian system with the help of the correspondence basic modules-stencils that can create the initial variant of the future colored - dotted mathematical illustrations that will allow to convert this idea into the huge interminable scientific kaleidoscope or mathematical casket with dozens of drawings and illustrations for further professional studying the natural numbers, their complex-algebraic equivalents themselves, and their colored graphics and the mathematical infinity as well.

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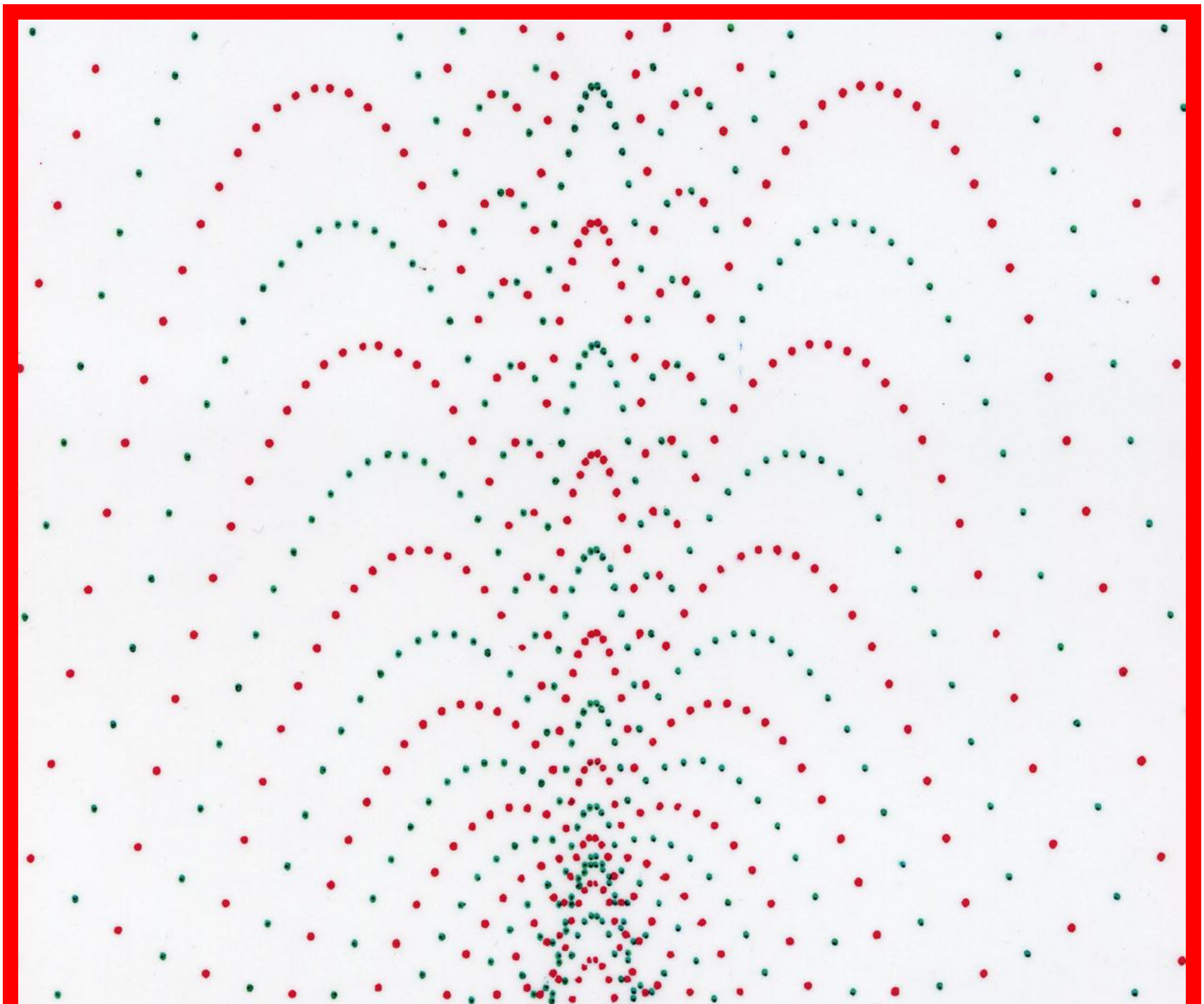
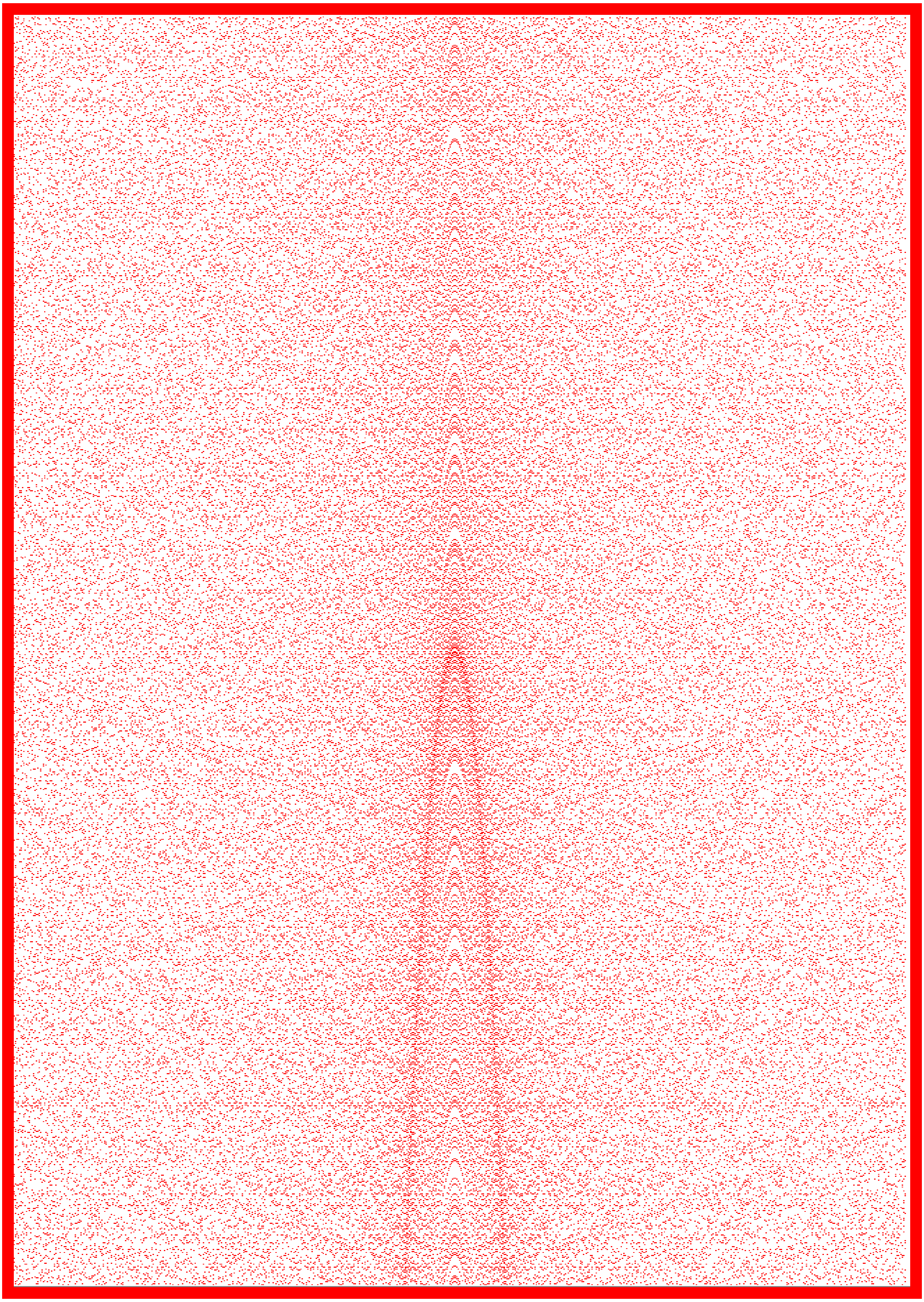
My colored dotted plots.

(LIST OF ILLUSTRATIONS)

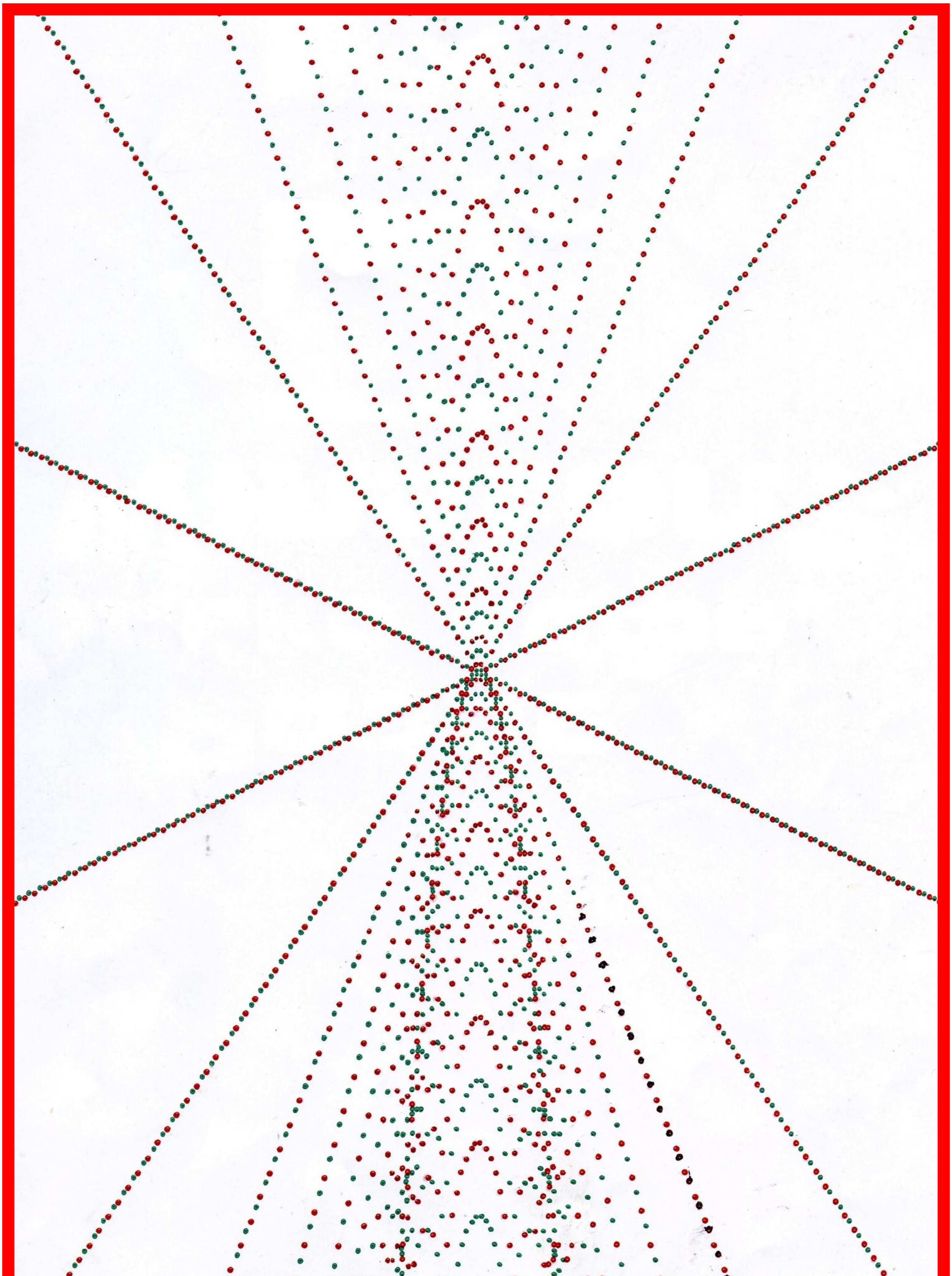
(the axes are not shown conventionally)



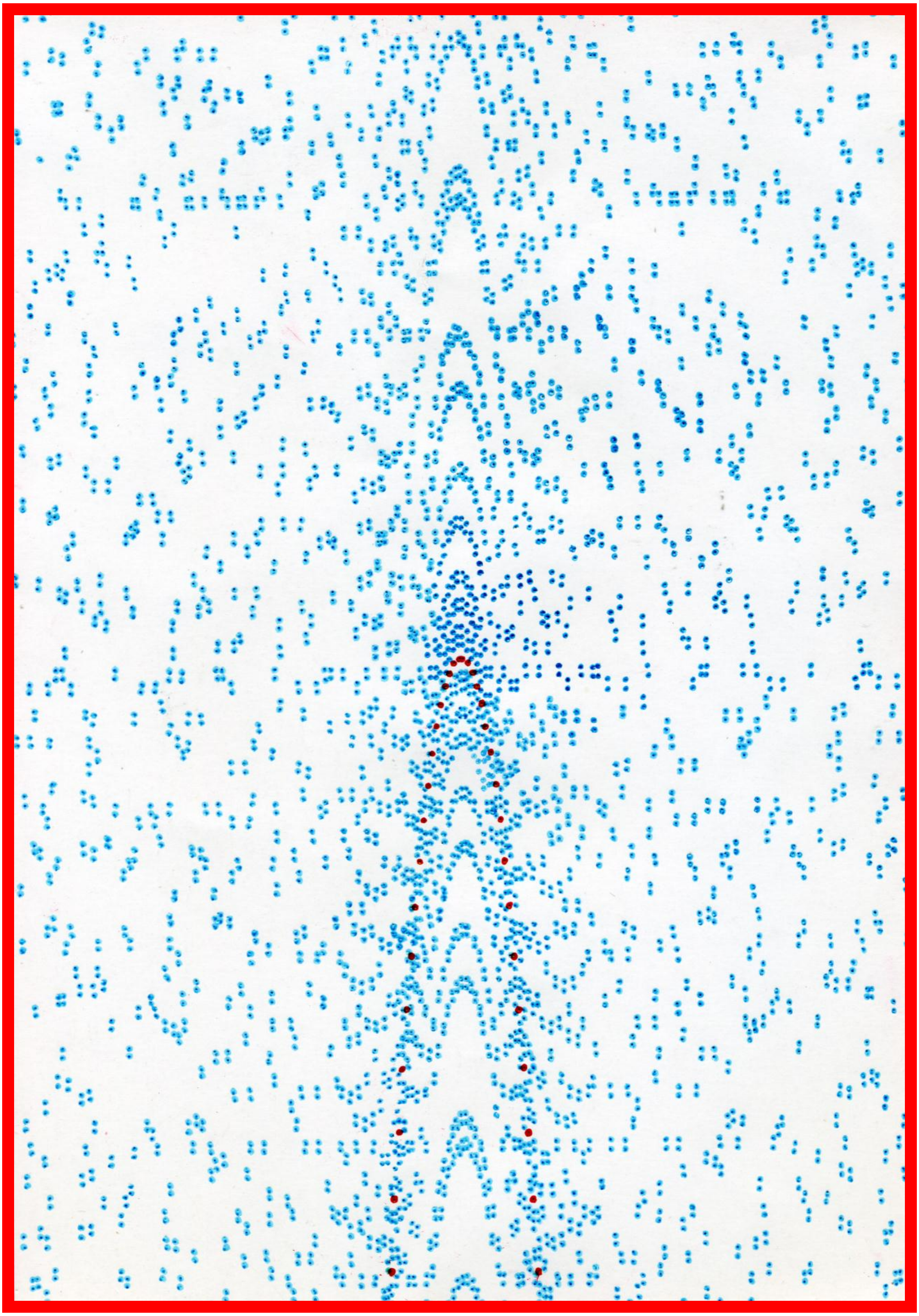
1. $\{A_n\} = \{n^2\}$



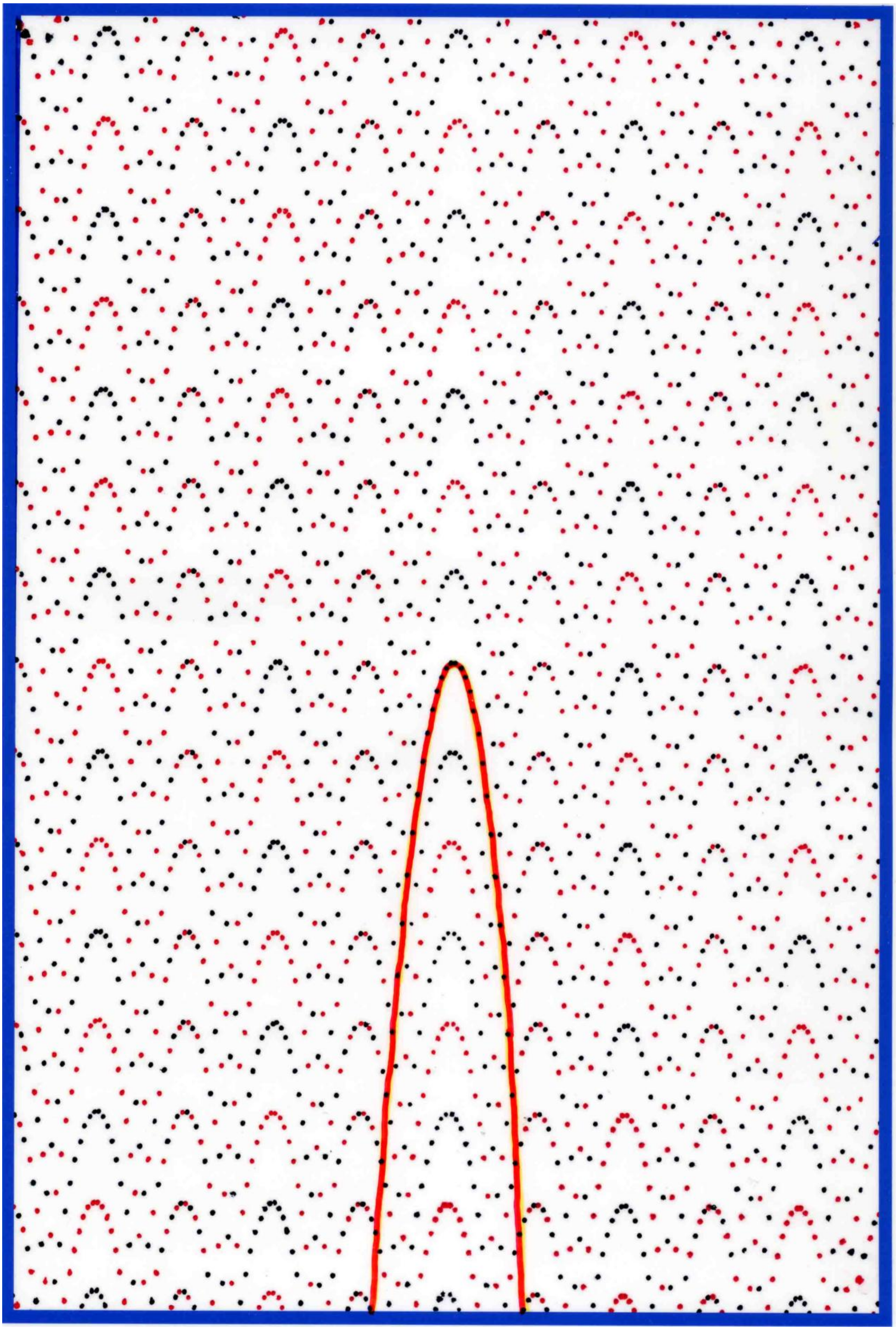
2. $\{A_n\} = \{\pi_n\}$



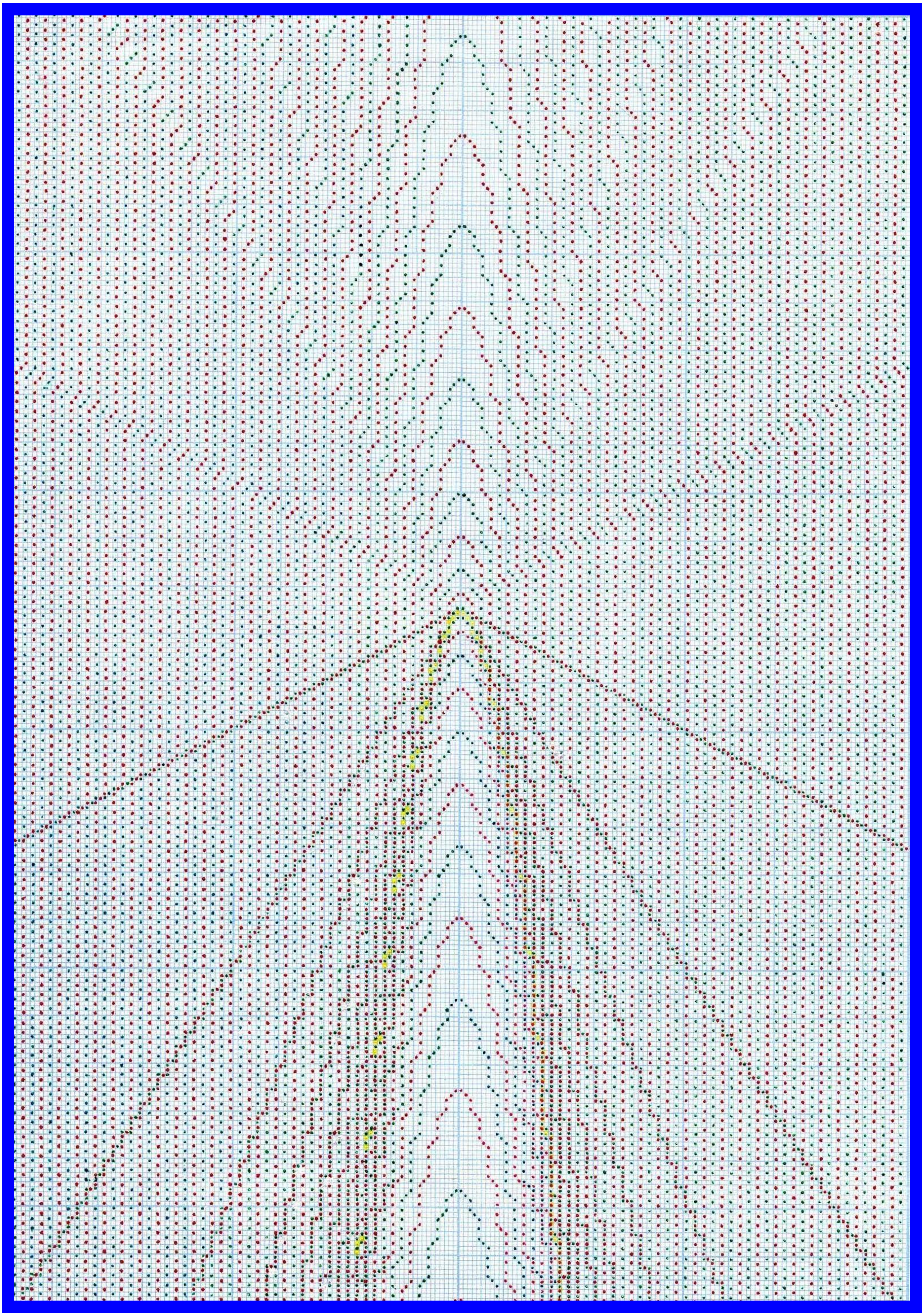
3. $\{A_n\} = \{ (2n - 1)^2 \cup (4n^2) \}$



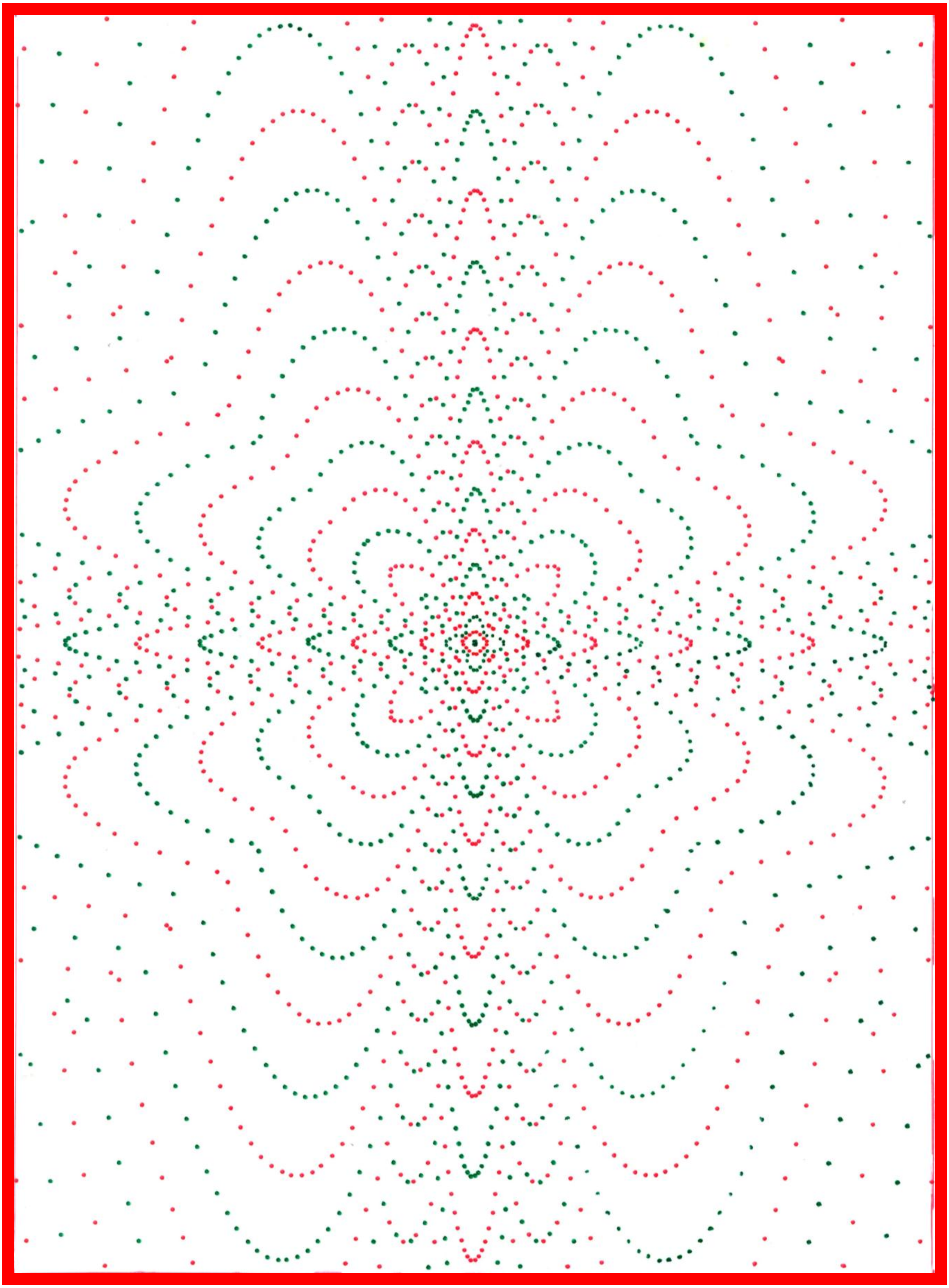
4. Twin numbers plot.



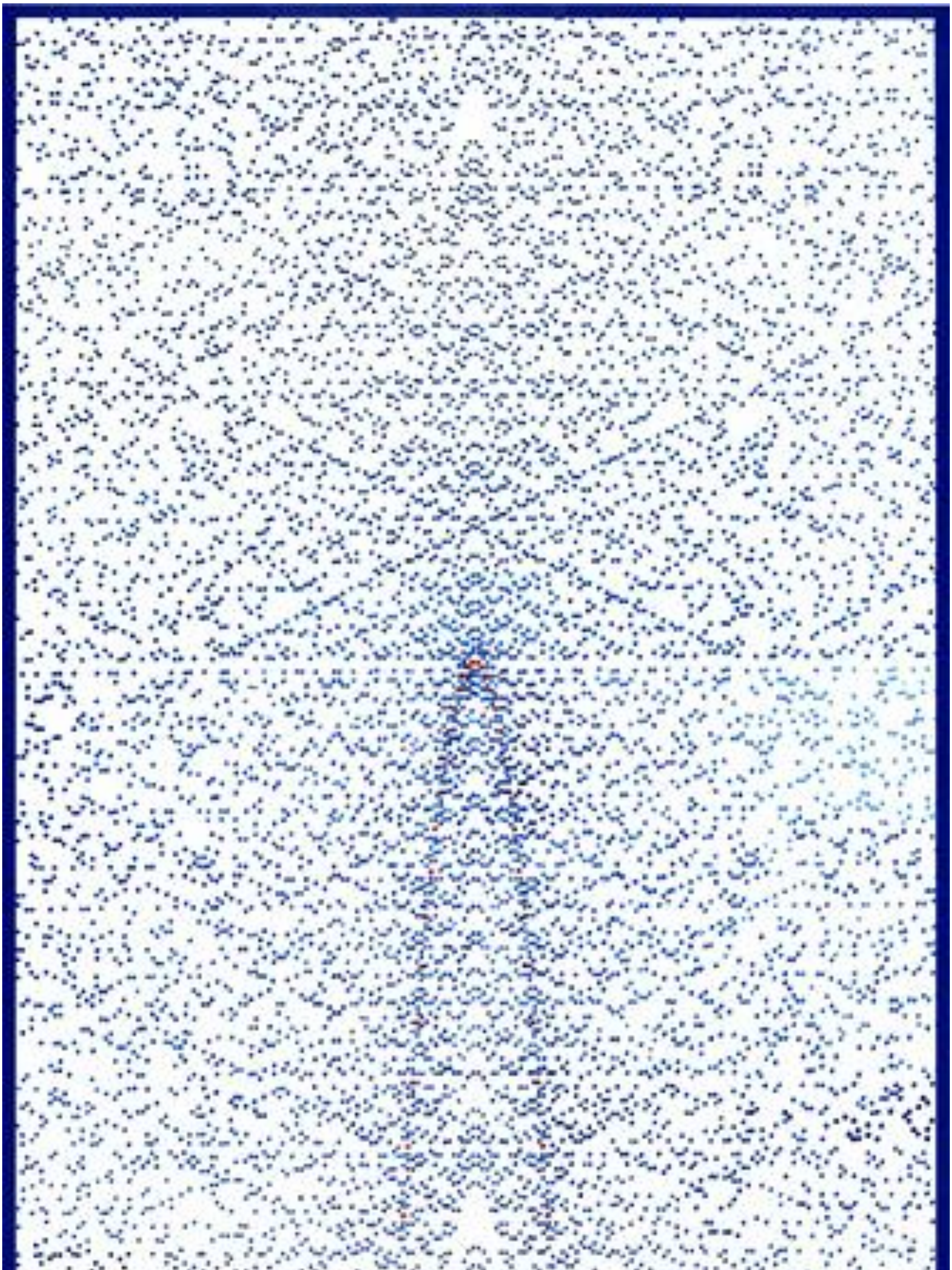
5. $\{A_n\} = \{19n^2\}$



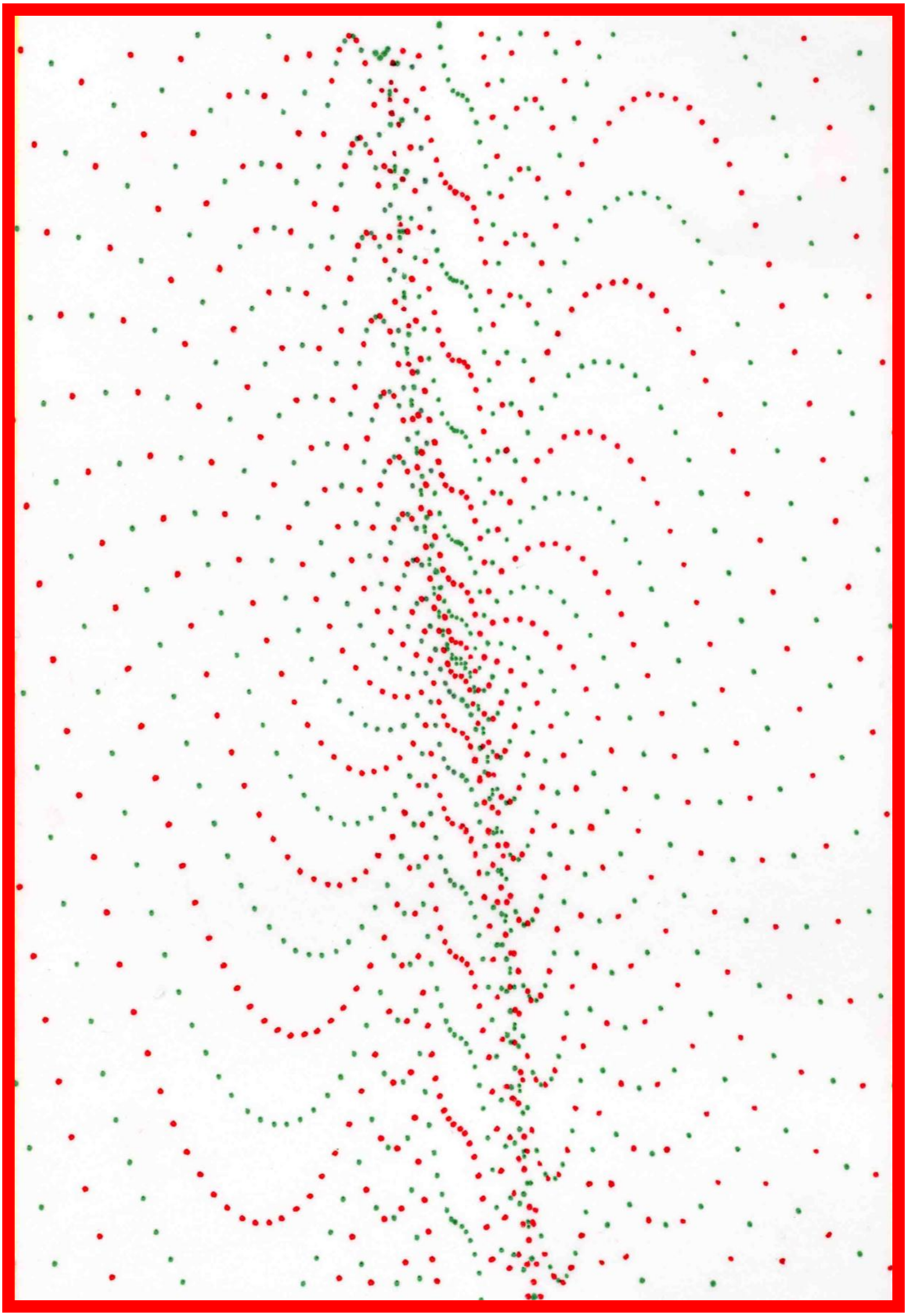
6. Ideal visualization of Navier - Stokes differential equations.



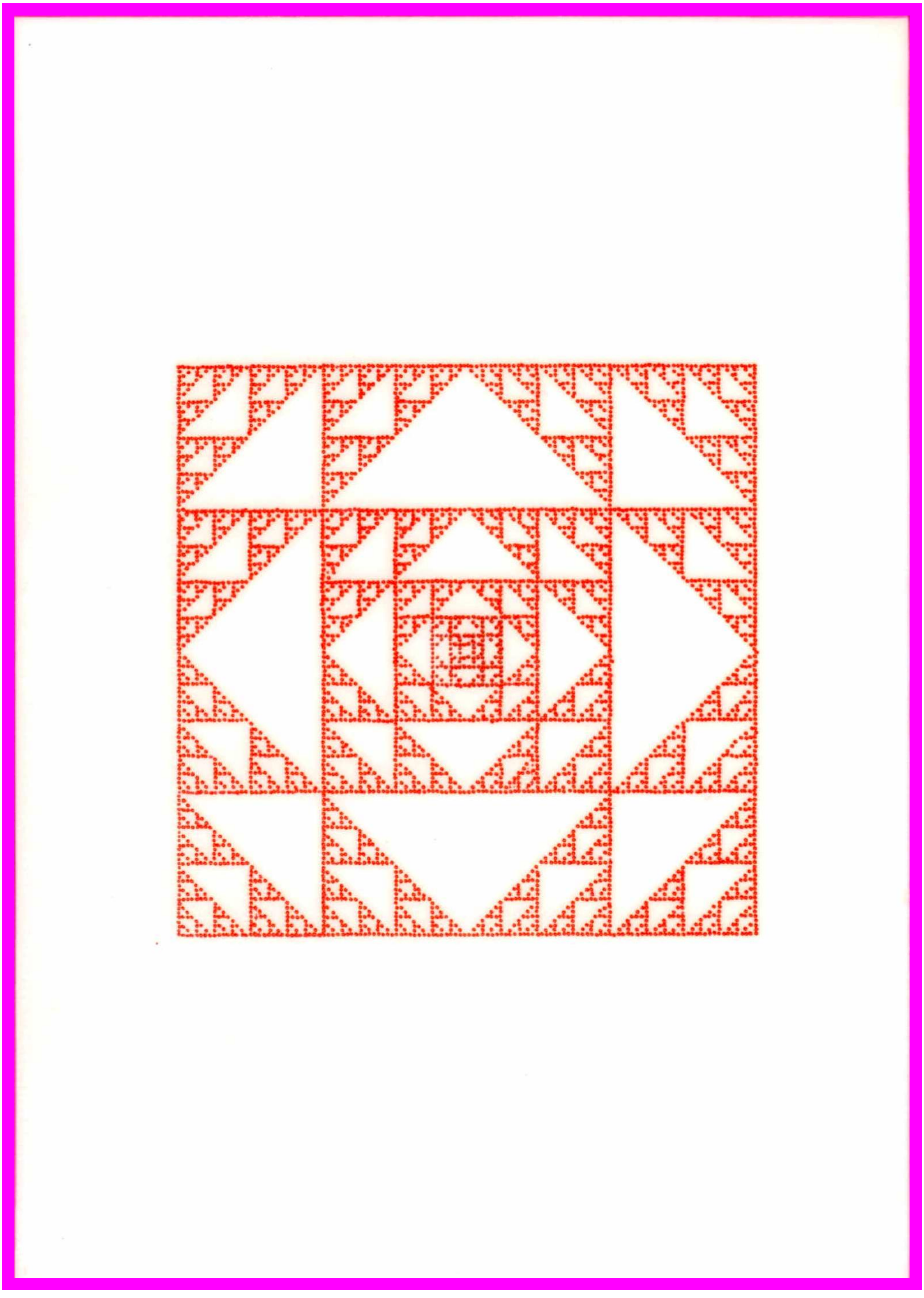
7. Big Bang



8. $\{A_n\} = \{\pi_n\}$



9. $\{A_n\} = \{n^2\}$-anti-mirror.



10. Interminable Square - cubic fractal

11. Academy’s official emblem.