

Digital Table of Solar System

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ABSTRACT

This paper discusses cyberinformation studies of the Solar System, in particular the identification of scientific terminology that could describe this phenomenon, that is, the study of Solar System, as well as the relationship between the astronomical language of Solar System and theoretical aspect of this system and cybernetics. The result of this research show that there is a matrix code for Solar System. It also shows that the coding system within the planetary language gives detailed information, not only on the planetary “record“, but also on its structure, configuration and its various shapes. The issue of the existence of a planetary code and coding of the individual structural planets of this system are discussed. Is the planetary information characterized only by physical, or also by cyberinformation principles? The potential effects of physical and Orbital characteristics, as well as cybernetic and information principles, on the atronomical basis of Solar System are also investigated. This paper discusses new methods for developing astronomy technologies, in particular more advanced digital technology based on programming, cybernetics, and informational laws and systems, and how this new technology could be useful in astronomy, bioinformatics and other natural sciences.

Keywords: Digital table of Solar system; orbital code; perihelion and aphelion

1. INTRODUCTION

Solar System can be represented by two different forms, ie, a discrete form and a sequential form. In the discrete form, a Solar System is represented by a set of discrete codes or a multiple dimension vector. In the sequential form, a Solar System is represent by a astronomical and orbital characteristics of planets.

Therefore, the sequential form can naturally reflect all the information about the planets order and lenght of a Solar System. The key issue is whether we can develop a different discrete method of representing a Solar System that will allow accomodation of partial, if not all planets order information? Because a Solar System is usually represented by a series of planets should be assigned to these codes in order to optimally convert the planetary sequence order information into a series of numbers for the discrete form representation?

2. RESULTS

The matrix mechanism of Solar System, the evolution of planets and especially, the astronomical evolution of cosmic language, have been analyzed by the application of cybernetic methods, information theory and system theory, respectively. The primary structure of a planetary systems is the exact specification of its planetary composition and the planetary bonds those planets.

Perihelion and Aphelion planets of the Solar system

Merkur	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>	<u>Perihelion</u>
46001200	107476259	147098290	206669000	740573600	1353572956	2748938461	4452940833
1	2	3	4	5	6	7	8

Merkur	Venus	EARTH	Mars	Jupiter	Saturn	Uranus	Neptune
<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>	<u>Aphelion</u>
69816900	108942109	152098232	249209300	816520800	1513325783	3004419704	4553946490
1	2	3	4	5	6	7	8

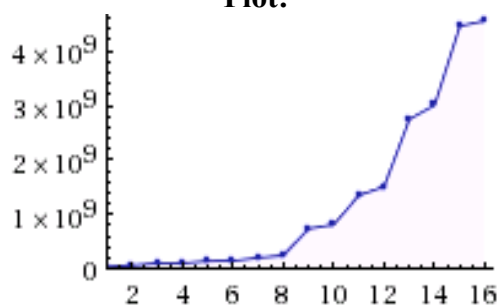
This text translates of **perihelion** and **aphelion** from a digital form.

2. 1. Algorithm

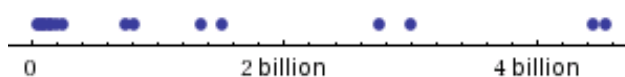
Input:

{46 001 200, 69 816 900, 107 476 259, 108 942 109, 147 098 290, 152 098 232,
206 669 000, 249 209 300, 740 573 600, 816 520 800, 1 353 572 956,
1 513 325 783, 2 748 938 461, 3 004 419 704, 4 452 940 833, 4 553 946 490}

Plot:



Number line:



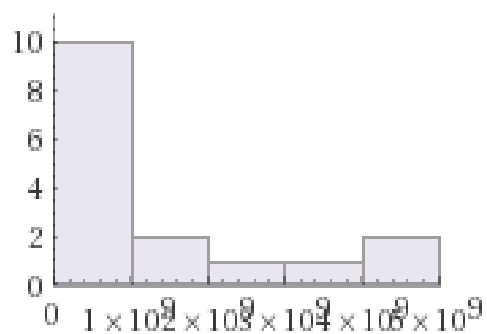
Length of data:

16 items

Total:

$$46\,001\,200 + 69\,816\,900 + \dots + 4\,452\,940\,833 + 4\,553\,946\,490 = 20\,271\,549\,917$$

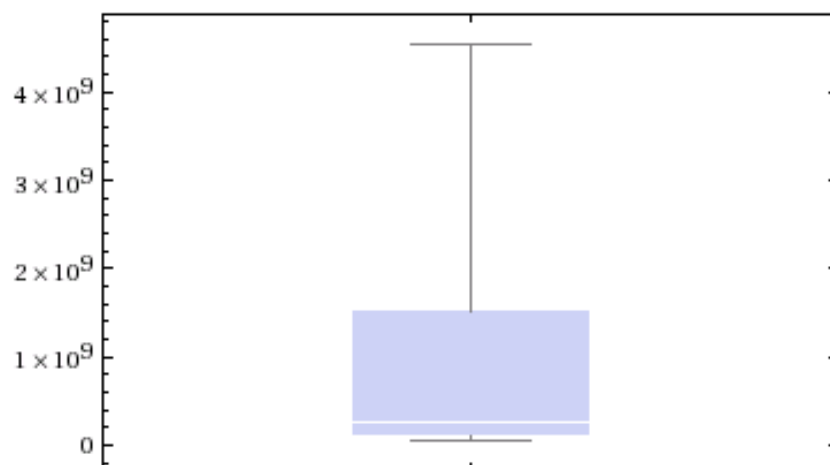
Histogram:

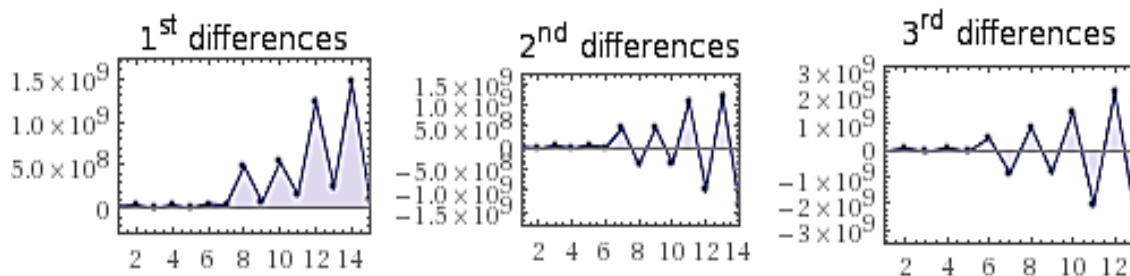
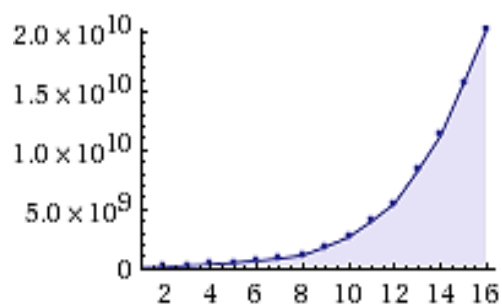


Statistics:

mean	1.267×10^9
median	4.949×10^8
sample standard deviation	1.57×10^9

Box and whisker chart:



Differences:**Cumulative sums:****Successive ratios:**

Using closest Wolfram|Alpha interpretation: ratios {46001200, 69816900, 107476259, 108942109, 147098290, 152098232, 206669000, 249209300, 740573600, 816520800, 1353572956, 1513325783, 2748938461, 3004419704, 4452940833, 4553946490}

Input interpretation:

46 001 200 : 69 816 900 : 107 476 259 : 108 942 109 : 147 098 290 : 152 098 232 :
 206 669 000 : 249 209 300 : 740 573 600 : 816 520 800 : 1 353 572 956 :
 1 513 325 783 : 2 748 938 461 : 3 004 419 704 : 4 452 940 833 : 4 553 946 490

correlation {46001200, 69816900, 107476259, 108942109, 147098290, 152098232, 206669000, 249209300, 740573600, 816520800, 1353572956, 1513325783, 2748938461, 3004419704, 4452940833, 4553946490}

Input:

```
ListCorrelate[{46 001 200, 69 816 900, 107 476 259, 108 942 109, 147 098 290,
  152 098 232, 206 669 000, 249 209 300, 740 573 600, 816 520 800, 1 353 572 956,
  1 513 325 783, 2 748 938 461, 3 004 419 704, 4 452 940 833, 4 553 946 490},
{46 001 200, 69 816 900, 107 476 259, 108 942 109, 147 098 290, 152 098 232,
  206 669 000, 249 209 300, 740 573 600, 816 520 800, 1 353 572 956,
  1 513 325 783, 2 748 938 461, 3 004 419 704, 4 452 940 833, 4 553 946 490}], {1}
```

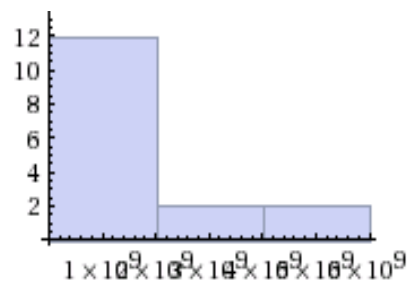
Result:

{62 667 780 431 842 284 037, 50 372 078 113 535 004 678,
 37 421 019 515 935 943 419, 28 337 317 234 870 685 051, 19 675 615 082 715 287 775,
 15 217 135 846 276 911 565, 11 096 050 540 423 091 781, 8 696 843 665 586 570 188,
 6 635 835 606 893 433 938, 8 696 843 665 586 570 188, 11 096 050 540 423 091 781,
 15 217 135 846 276 911 565, 19 675 615 082 715 287 775, 28 337 317 234 870 685 051,
 37 421 019 515 935 943 419, 50 372 078 113 535 004 678}

histogram {46001200, 69816900, 107476259, 108942109, 147098290, 152098232,
 206669000, 249209300, 740573600, 816520800, 1353572956, 1513325783, 2748938461,
 3004419704, 4452940833, 4553946490}

Input interpretation:

histogram	{46 001 200, 69 816 900, 107 476 259, 108 942 109, 147 098 290, 152 098 232, 206 669 000, 249 209 300, 740 573 600, 816 520 800, 1 353 572 956, 1 513 325 783, 2 748 938 461, 3 004 419 704, 4 452 940 833, 4 553 946 490}
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Histogram:**Input:**

ToeplitzMatrix [{46 001 200, 69 816 900, 107 476 259, 108 942 109, 147 098 290,
 152 098 232, 206 669 000, 249 209 300, 740 573 600, 816 520 800, 1 353 572 956,
 1 513 325 783, 2 748 938 461, 3 004 419 704, 4 452 940 833, 4 553 946 490}]

Result:

We shall now give some mathematical evidences that will prove that in the Solar System there really is programmatic and cybernetic algorithm in which it is „recorded“, in the language of mathematics, how the planets will be built and what will be the quantitative characteristics of the given planetary information.

Digital Table of the Perihelion and Aphelion

Merkur	Merkur	Venus	Venus	Earth	Earth	Mars	Mars
46001200	69816900	107476259	108942109	147098290	152098232	206669000	249209300
Merkur	Merkur	Merkur	Venus	Venus	Earth	Earth	Mars
69816900	46001200	69816900	107476259	108942109	147098290	152098232	206669000
Venus	Merkur	Merkur	Merkur	Venus	Venus	Earth	Earth
107476259	69816900	46001200	69816900	107476259	108942109	147098290	152098232
Venus	Venus	Merkur	Merkur	Merkur	Venus	Venus	Earth
108942109	107476259	69816900	46001200	69816900	107476259	108942109	147098290
Earth	Venus	Venus	Merkur	Merkur	Merkur	Venus	Venus
147098290	108942109	107476259	69816900	46001200	69816900	107476259	108942109
Earth	Earth	Venus	Venus	Merkur	Merkur	Merkur	Venus
152098232	147098290	108942109	107476259	69816900	46001200	69816900	107476259
Mars	Earth	Earth	Venus	Venus	Merkur	Merkur	Merkur
206669000	152098232	147098290	108942109	107476259	69816900	46001200	69816900
Mars	Mars	Earth	Earth	Venus	Venus	Merkur	Merkur
249209300	206669000	152098232	147098290	108942109	107476259	69816900	46001200
Jupiter	Mars	Mars	Earth	Earth	Venus	Venus	Merkur
740573600	249209300	206669000	152098232	147098290	108942109	107476259	69816900
Jupiter	Jupiter	Mars	Mars	Earth	Earth	Venus	Venus
816520800	740573600	249209300	206669000	152098232	147098290	108942109	107476259
Saturn	Jupiter	Jupiter	Mars	Mars	Earth	Earth	Venus
1353572956	816520800	740573600	249209300	206669000	152098232	147098290	108942109
Saturn	Saturn	Jupiter	Jupiter	Mars	Mars	Earth	Earth
1513325783	1353572956	816520800	740573600	249209300	206669000	152098232	147098290
Uranus	Saturn	Saturn	Jupiter	Jupiter	Mars	Mars	Earth
2748938461	1513325783	1353572956	816520800	740573600	249209300	206669000	152098232
Uranus	Uranus	Saturn	Saturn	Jupiter	Jupiter	Mars	Mars
3004419704	2748938461	1513325783	1353572956	816520800	740573600	249209300	206669000
Neptune	Uranus	Uranus	Saturn	Saturn	Jupiter	Jupiter	Mars
4452940833	3004419704	2748938461	1513325783	1353572956	816520800	740573600	249209300
Neptune	Neptune	Uranus	Uranus	Saturn	Saturn	Jupiter	Jupiter
4553946490	4452940833	3004419704	2748938461	1513325783	1353572956	816520800	740573600
20271549917	15787420327	11441955753	8546478158	5944637987	4583410436	3436506480	2869194980

Jupiter	Jupiter	Saturn	Saturn	Uranus	Uranus	Neptune	Neptune
740573600	816520800	1353572956	1513325783	2748938461	3004419704	4452940833	4553946490
Mars	Jupiter	Jupiter	Satur	Saturn	Uranus	Uranus	Neptune
249209300	740573600	816520800	1353572956	1513325783	2748938461	3004419704	4452940833
Mar	Mars	Jupiter	Jupiter	Saturn	Saturn	Uranus	Uranus
206669000	249209300	740573600	816520800	1353572956	1513325783	2748938461	3004419704
Earth	Mars	Mars	Jupiter	Jupiter	Saturn	Saturn	Uranus
152098232	206669000	249209300	740573600	816520800	1353572956	1513325783	2748938461
Earth	Earth	Mars	Mars	Jupiter	Jupiter	Saturn	Saturn
147098290	152098232	206669000	249209300	740573600	816520800	1353572956	1513325783
Mars	Earth	Earth	Mars	Mars	Jupiter	Jupiter	Saturn
108942109	147098290	152098232	206669000	249209300	740573600	816520800	1353572956
Venus	Mars	Earth	Earth	Mars	Mars	Jupiter	Jupiter
107476259	108942109	147098290	152098232	206669000	249209300	740573600	816520800
Merkur	Venus	Mars	Earth	Earth	Mars	Mars	Jupiter
69816900	107476259	108942109	147098290	152098232	206669000	249209300	740573600
Merkur	Merkur	Venus	Mars	Earth	Earth	Mars	Mars
46001200	69816900	107476259	108942109	147098290	152098232	206669000	249209300
Merkur	Merkur	Merkur	Venus	Mars	Earth	Earth	Mars
69816900	46001200	69816900	107476259	108942109	147098290	152098232	206669000
Venus	Merkur	Merkur	Merkur	Venus	Mars	Earth	Earth
107476259	69816900	46001200	69816900	107476259	108942109	147098290	152098232
Mars	Venus	Merkur	Merkur	Merkur	Venus	Mars	Earth
108942109	107476259	69816900	46001200	69816900	107476259	108942109	147098290

Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259	Mars 108942109
Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259
Mars 206669000	Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900
Mars 249209300	Mars 206669000	Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200
2869194980	3436506480	4583410436	5944637987	8546478158	11441955753	15787420327	20271549917

Within the digital pictures in astronomy, the physical and chemical parameters are in a strict compliance with programmatic, cybernetic and information principles. The digital language of astronomy has a countless number of codes and analogue codes, as well as other information content. These pictures enable us to realize the very essence of functioning of astronomical phenomenons (Orbital characteristics, physical characteristics, etc.). There are some examples:

Digital correlations of the Perihelion and Aphelion:

Earth 147098290	Earth 152098232	Mars 206669000	Mars 249209300	Jupiter 740573600	Jupiter 816520800	Saturn 1353572956	Saturn 1513325783
Venus 108942109	Earth 147098290	Earth 152098232	Mars 206669000	Mars 249209300	Jupiter 740573600	Jupiter 816520800	Satur 1353572956
Venus 107476259	Venus 108942109	Earth 147098290	Earth 152098232	Mar 206669000	Mars 249209300	Jupiter 740573600	Jupiter 816520800
Merkur 69816900	Venus 107476259	Venus 108942109	Earth 147098290	Earth 152098232	Mars 206669000	Mars 249209300	Jupiter 740573600
Merkur 46001200	Merkur 69816900	Venus 107476259	Venus 108942109	Earth 147098290	Earth 152098232	Mars 206669000	Mars 249209300
Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259	Mars 108942109	Earth 147098290	Earth 152098232	Mars 206669000
Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259	Mars 108942109	Earth 147098290	Earth 152098232
Venus 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259	Mars 108942109	Earth 147098290
Earth 147098290	Venus 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259	Mars 108942109
Earth 152098232	Earth 147098290	Venus 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900	Venus 107476259
Mars 206669000	Earth 152098232	Earth 147098290	Venus 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200	Merkur 69816900
Mars 249209300	Mars 206669000	Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900	Merkur 46001200
Jupiter 740573600	Mars 249209300	Mars 206669000	Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259	Merkur 69816900
Jupiter 816520800	Jupiter 740573600	Mars 249209300	Mars 206669000	Earth 152098232	Earth 147098290	Mars 108942109	Venus 107476259
Saturn	Jupiter	Jupiter	Mars	Mars	Earth	Earth	Mars

1353572956	816520800	740573600	249209300	206669000	152098232	147098290	108942109
Saturn	Saturn	Jupiter	Jupiter	Mars	Mars	Earth	Earth
1513325783	1353572956	816520800	740573600	249209300	206669000	152098232	147098290
5944637987	4583410436	3436506480	2869194980	2869194980	3436506480	4583410436	5944637987

A these digital Table of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant. A digital square contains the integers from 1 to n^2 . The term "digital square" is also sometimes used to refer to any of various types of word square.

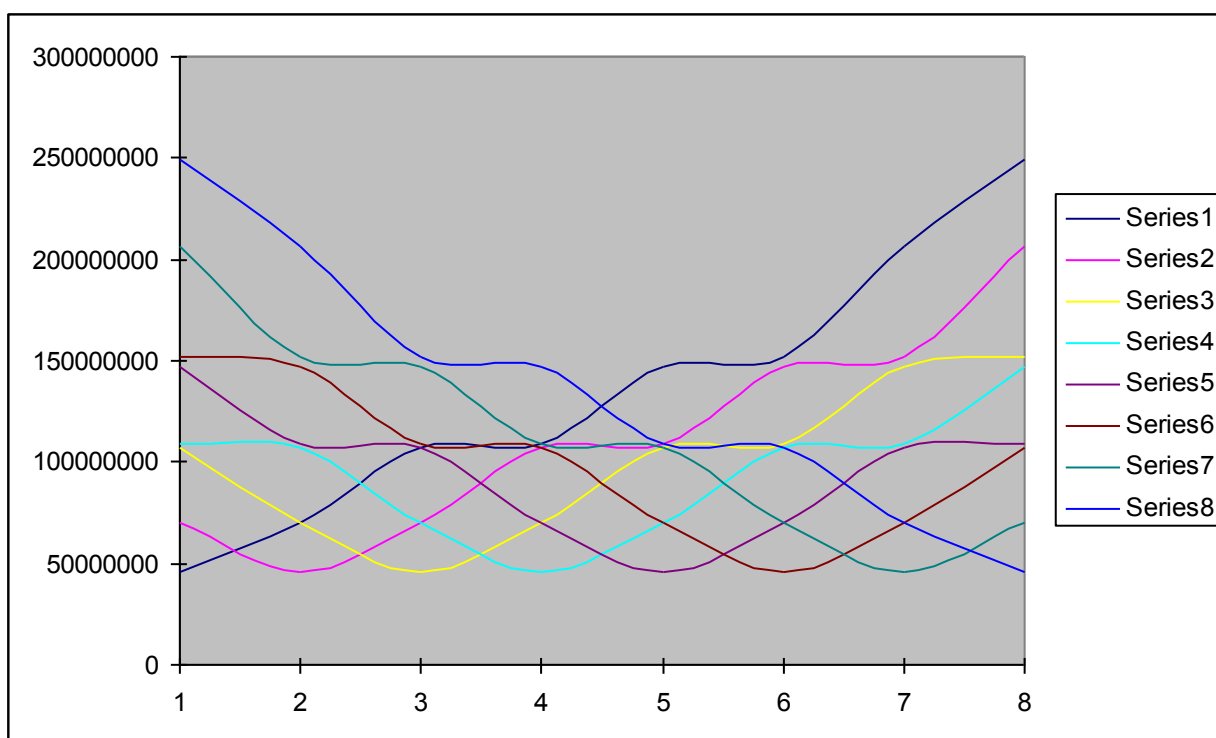


Fig. 1. Schematic representation of the Digital Table of Solar System.

Establishing of numeric values of the Perihelion and Aphelion to be done through use of strictly determined criterion from the theory of systems and also from cybernetics which, in this example, is the Perihelion and Aphelion. That is only one dimension of the digital image of Solar System. There are many other dimensions as well as digital images. Each of these dimensions and images has its corresponding progression. With some dimensions, one has to use some other parameters from the theory of systems and cybernetics (frequency, standard deviation, various codes and analogue codes, analogue values, primary and secondary values, odd-even relation, and many others), and not progression.

Regardless of the fact whether there is a typical correlation between parameters or not, their effect in the process of formation of the Solar System can be followed through use of adequate methodology. Examples:

The middle part of the digital table Solar system:

Merkur	Merkur	Venus	Venus	Earth	Earth	Mars	Mars
46001200	69816900	107476259	108942109	147098290	152098232	206669000	249209300
Merkur	Merkur	Merkur	Venus	Mars	Earth	Earth	Mars
69816900	46001200	69816900	107476259	108942109	147098290	152098232	206669000
Venus	Merkur	Merkur	Merkur	Venus	Mars	Earth	Earth
107476259	69816900	46001200	69816900	107476259	108942109	147098290	152098232
Venus	Venus	Merkur	Merkur	Merkur	Venus	Mars	Earth
108942109	107476259	69816900	46001200	69816900	107476259	108942109	147098290
Earth	Venus	Venus	Merkur	Merkur	Merkur	Venus	Mars
147098290	108942109	107476259	69816900	46001200	69816900	107476259	108942109
Earth	Earth	Venus	Venus	Merkur	Merkur	Merkur	Venus
152098232	147098290	108942109	107476259	69816900	46001200	69816900	107476259
Mars	Earth	Earth	Venus	Venus	Merkur	Merkur	Merkur
206669000	152098232	147098290	108942109	107476259	69816900	46001200	69816900
Mars	Mars	Earth	Earth	Mars	Venus	Merkur	Merkur
249209300	206669000	152098232	147098290	108942109	107476259	69816900	46001200
10873111290	907918890	808726149	765570026	765570026	808726149	907918890	10873111290

46001200	69816900	107476259	108942109	147098290	152098232	206669000	249209300
69816900	46001200	69816900	107476259	108942109	147098290	152098232	206669000
107476259	69816900	46001200	69816900	107476259	108942109	147098290	152098232
108942109	107476259	69816900	46001200	69816900	107476259	108942109	147098290
147098290	108942109	107476259	69816900	46001200	69816900	107476259	108942109
152098232	147098290	108942109	107476259	69816900	46001200	69816900	107476259
206669000	152098232	147098290	108942109	107476259	69816900	46001200	69816900
249209300	206669000	152098232	147098290	108942109	107476259	69816900	46001200
10873111290	907918890	808726149	765570026	765570026	808726149	907918890	10873111290

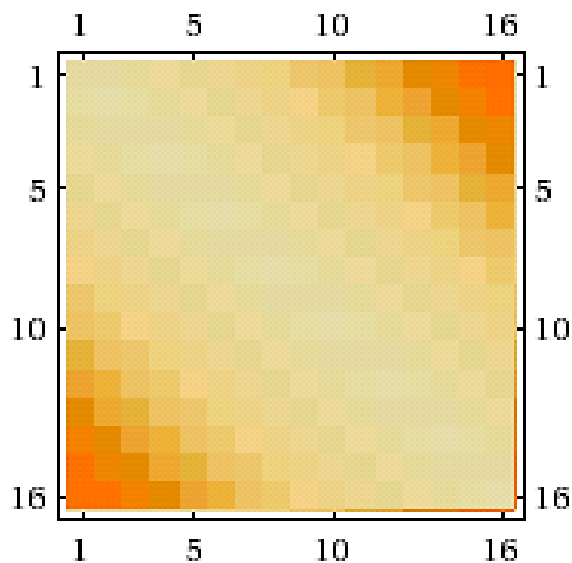
etc.

Making a sequence of all phenomena in digital Solar System is conducted according to the exact mathematical laws (for such descriptions we can use theory of systems and cybernetics).

There are some aexamples:

Dimensions:

16 (rows) x 16 (columns)

Matrix plot:**Properties:**

symmetric

toeplitz

Determinant:

1 164852029313230771321512058359970923039267648388578875554946325`.
 013660473893811062257961606057897145785851037437041290850391037`.
 568216078373

Trace:

736 019 200

Condition number:

693.258

The results of our research show that the processes of sequencing the Solar system are conditioned and arranged not only with orbital characteristics of planets, but also with program, cybernetic and informational lawfulness too. Translation of the cosmic language of these table into a digital language may be very useful for developing new methods of predicting of phenomenon in astronomy.

Characteristic polynomial:

$$\begin{aligned}
& x^{16} - 736\,019\,200x^{15} - 150\,835\,710\,847\,844\,074\,722x^{14} - \\
& 48\,737\,694\,726\,584\,462\,980\,444\,962\,312x^{13} + \\
& 342\,659\,832\,942\,335\,769\,388\,067\,987\,779\,503\,193\,587x^{12} + \\
& 119\,052\,677\,518\,083\,632\,847\,068\,522\,666\,425\,010\,802\,155\,232\,532x^{11} - \\
& 152\,210\,197\,447\,629\,461\,069\,271\,085\,988\,371\,331\,596\,595\,266\,746\,780\,997\,351x^{10} - \\
& 52\,972\,257\,573\,884\,426\,228\,071\,791\,143\,083\,730\,708\,273\,268\,163\,501\,454\,830\,050\,320x^9 + \\
& 728x^8 + \\
& 18\,348\,788\,922\,485\,555\,382\,864\,840\,257\,462\,153\,653\,386\,259\,280\,588\,887\,710\,027\,629x^7 + \\
& 198\,389\,234\,979x^6 + \\
& 6\,106\,553\,279\,325\,951\,942\,366\,952\,557\,623\,683\,581\,807\,145\,914\,997\,098\,059\,047\,222x^5 - \\
& 832\,016\,621\,864\,233\,607\,564x^4 - \\
& 936\,218\,469\,627\,212\,514\,145\,445\,897\,559\,426\,381\,969\,859\,579\,231\,860\,121\,237\,044\,320x^3 - \\
& 853\,982\,829\,471\,343\,771\,179\,967\,556x^2 - \\
& 269\,643\,811\,439\,593\,138\,234\,559\,040\,327\,456\,225\,646\,657\,125\,969\,894\,880\,971\,803\,522x + \\
& 741\,973\,797\,629\,660\,998\,516\,156\,591\,804\,930\,116x^5 + \\
& 22\,157\,887\,896\,627\,137\,601\,811\,070\,435\,762\,209\,449\,097\,199\,756\,635\,355\,894\,973\,830x^4 + \\
& 382\,794\,596\,837\,064\,847\,526\,697\,675\,183\,989\,354\,729\,170\,214x^3 + \\
& 4\,653\,890\,839\,441\,101\,366\,609\,599\,715\,564\,162\,022\,021\,340\,090\,822\,187\,363\,474\,219x^2 - \\
& 032\,262\,373\,026\,216\,473\,334\,203\,263\,485\,200\,125\,936\,949\,117\,146\,279\,888x^3 - \\
& 228\,102\,205\,893\,138\,173\,461\,692\,037\,199\,072\,084\,734\,025\,770\,605\,488\,180\,651\,723\,858x^2 - \\
& 694\,579\,321\,350\,487\,105\,680\,695\,328\,872\,293\,179\,943\,947\,145\,738\,429\,867\,417\,321x^2 - \\
& x^2 - \\
& 23\,711\,237\,986\,822\,413\,124\,329\,818\,150\,008\,405\,146\,044\,699\,767\,568\,912\,280\,575\,035x + \\
& 933\,008\,274\,372\,760\,290\,624\,781\,215\,340\,170\,438\,241\,876\,738\,262\,425\,828\,764\,156x + \\
& 953\,760\,924x + \\
& 1\,164\,852\,029\,313\,230\,771\,321\,512\,058\,359\,970\,923\,039\,267\,648\,388\,578\,875\,554\,946x + \\
& 325\,013\,660\,473\,893\,811\,062\,257\,961\,606\,057\,897\,145\,785\,851\,037\,437\,041\,290\,850x + \\
& 391\,037\,568\,216\,078\,373
\end{aligned}$$

General resource:

<http://www.wolfram.com/products/mathematica>

3. CONCLUSIONS

The result of this research show that there is a matrix code for Solar System. Now we have the exact scientific proofs that there is an astronomical language that can be described by the theory of systems and cybernetics, and which functions in accordance with certain principles.

The process of sequencing in Solar System is conditioned and determined not only through astronomical, but also through cybernetic and information principles. The digital pictures of Solar System provide us with cybernetic and information interpretation of the

scientific facts. Now we have the exact scientific proofs that there is a astronomic language that can be described by the theory of systems and cybernetics, and which functions in accordance with certain principles.

References

- [1] L. Kurić, *International Letters of Chemistry, Physics and Astronomy* 10 (2014) 62-73.
- [2] L. Kurić, *J. Comput Sci Biol* 2 (2009) 101-116.
- [3] L. Kurić, *Journal de la Societe de statistique de Paris* 127(2) (1986).
- [4] L. Kurić, The Insulin Bio Code - Zero Frenquencies, *GJMR* 10(1) (2010) 15.
- [5] L. Kurić, *Advances and Applications in Bioinformatics and Chemistry*, 2010, 45-58.
- [6] L. Kurić, *GJMR* 1(1) (2010) 15.
- [7] L.Kurić, *International Journal of Computer Technology and Application* 2(2) (2011) 216-241.
- [8] L. Kurić, *International Journal of Computer Technology and Application* 2(2) (2011) 258-273.
- [9] L. Kurić, *Journal of Chemical Enginerring and Material Science* 2(5) (2011).

(Received 06 March 2014; accepted 12 March 2014)