

Velimir Khlebnikov's Laws of Time

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ABOUT VELIMIR KHLBNIKOV

a Russian poet and mathematician, a central part of
the Russian Futurist movement



(1885 – 1922)

In several works—like *Excerpt from The Tables of Destiny* or the conversation *Teacher and Student*—from his theoretical writings ([1]), Khlebnikov uses mathematical notions to illustrate and explain the results of his research on the connection of certain events. In the case of the polynomials or the powers of integers, the used numbers have some deeper meaning for Khlebnikov. In his work *Teacher and Student* ([1]), Khlebnikov presents the following conversation:

Teacher: And what else have you discovered?

Student: You see, I keep thinking about the action of the future on the past. But given the weight of ancient books that keeps pressing down on humanity, is it even possible to conceive such matters? No, mortal, cast your eyes peacefully downward! Whatever happened to the great destroyers of books? Their waves are as shaky a footing as the dry land of ignorance!

Teacher: Anything else?

Student: Anything else? Yes! You see, what I wanted was to read the writing traced by destiny on the scroll of human affairs. (...) I have discovered that in general a time period Z separates similar events:

$$Z = (365 + 48 \cdot y) \cdot x, \quad (1)$$

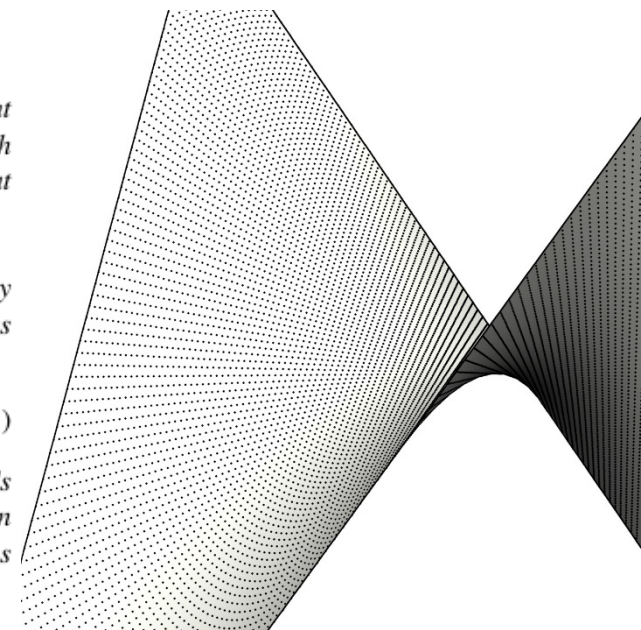
where y can have a positive or a negative value. (...) The conquest of Egypt in 1250 corresponds to the fall of the kingdom of Pergamum in 133. The Polovtsians overran the Russian steppe in 1093, 1383 years after the fall of Samnium in 290. And in 534 the kingdom of the Vandals was subjugated. Should we not therefore expect some state to fall in 1917?

Here, Khlebnikov claims that the polynomial (1) relates two dates in history and thus can even be used to predict the future. The relation between two dates is given by values x and y as shown in the examples. For $x = 2$, $y = 3$, the fall of Egypt in 1250 and the fall of Pergamum in -133 are related by

$$1250 - (-133) = 1383 = (365 + 48 \cdot 2) \cdot 3,$$

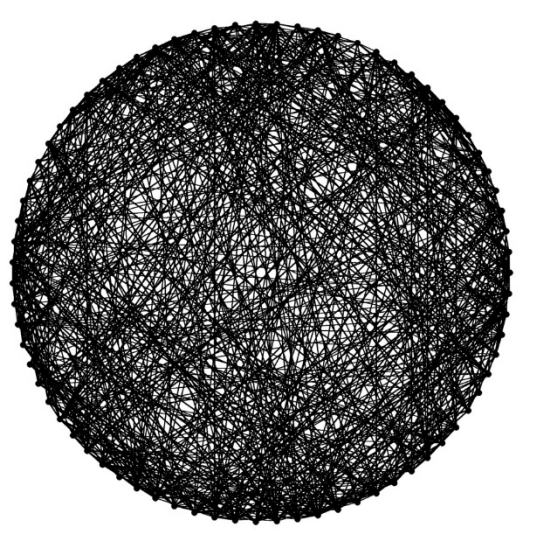
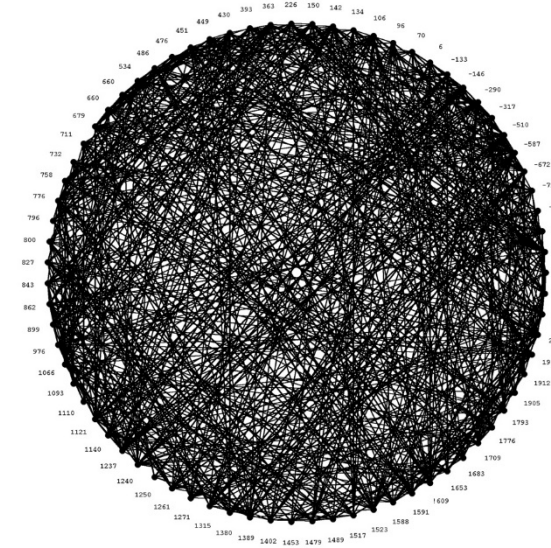
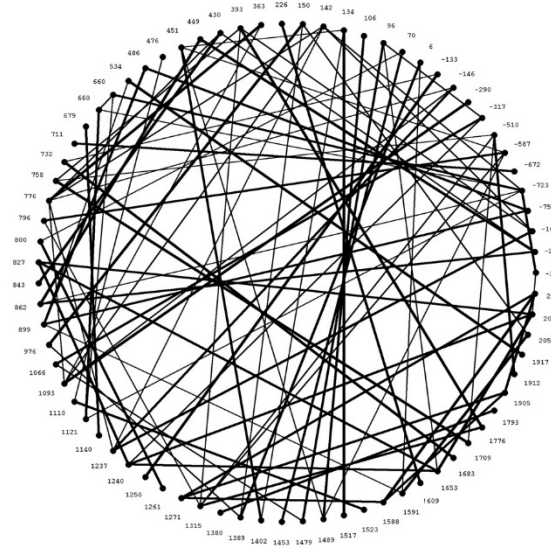
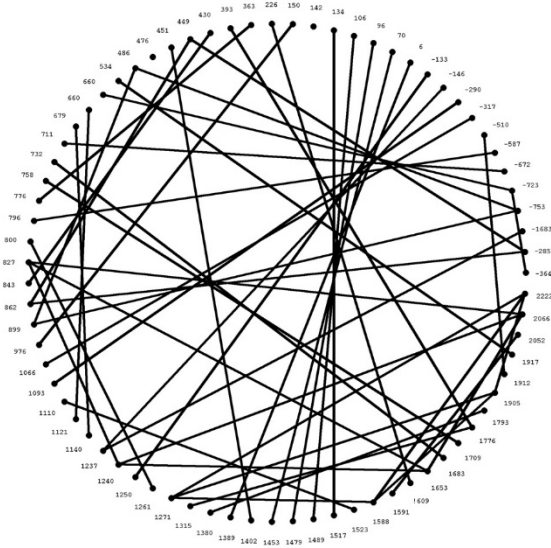
while for the same x and y , the dates of 534 and 1917 are related by

$$1917 - 534 = 1383 = (365 + 48 \cdot 2) \cdot 3.$$



References

- [1] C. Douglas. *Collected Works of Velimir Khlebnikov*, vol. 1, Harvard University Press, 1987.
- [2] R. Vroom. *Collected Works of Velimir Khlebnikov*, vol. 2, Harvard University Press, 1989.
- [3] A. Niederbude. *Mathematische Konzeptionen in der russischen Moderne*, Verlag Otto Sagner, 2006.



Open Question:

Given $a \in \mathbb{Z}$ and n numbers $m_1, \dots, m_n \in [0, a] \cap \mathbb{Z}$.

Consider the polynomial $P(x, y) = (365 + 48 \cdot y) \cdot x$.

Call m_i, m_j *connected* if $\exists x_{ij}, y_{ij} \in \mathbb{Z}$ s.t. $m_i - m_j = P(x_{ij}, y_{ij})$.

What is the expected number of connections in the set $\{m_i\}$?