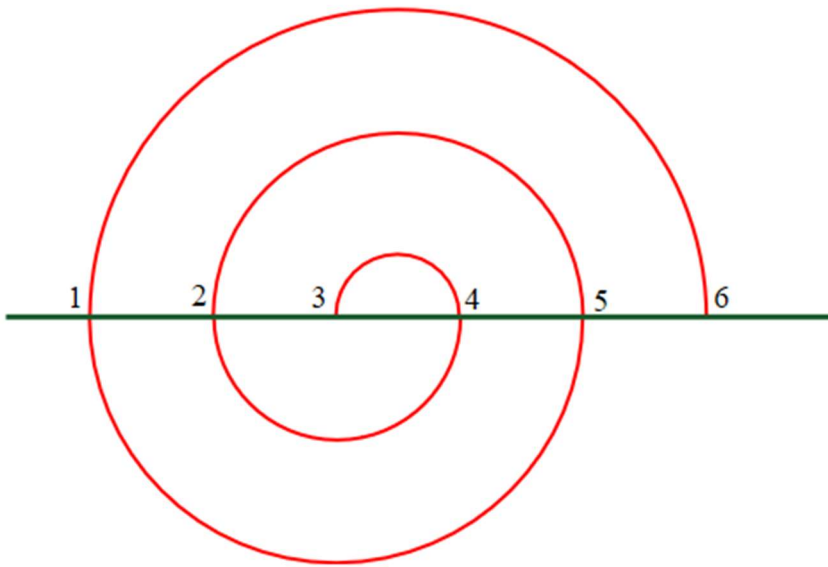


Prof. Dr. Alfred Toth

The role of Catherines in Semiotics

For Dr. Katherine Darling in deep thankfulness.

1. Catherines, together with 1-ines, 2-ines (or didines), 3-ines (or terines) are 4-ines, so-called Queneau¹ numbers for $n = 4$, the basic Queneau number, however, being defined for $n = 6$ (sexines) and visualized by the following spiral model (cf. Audran 2011)



in which the linear order of the Peano numbers

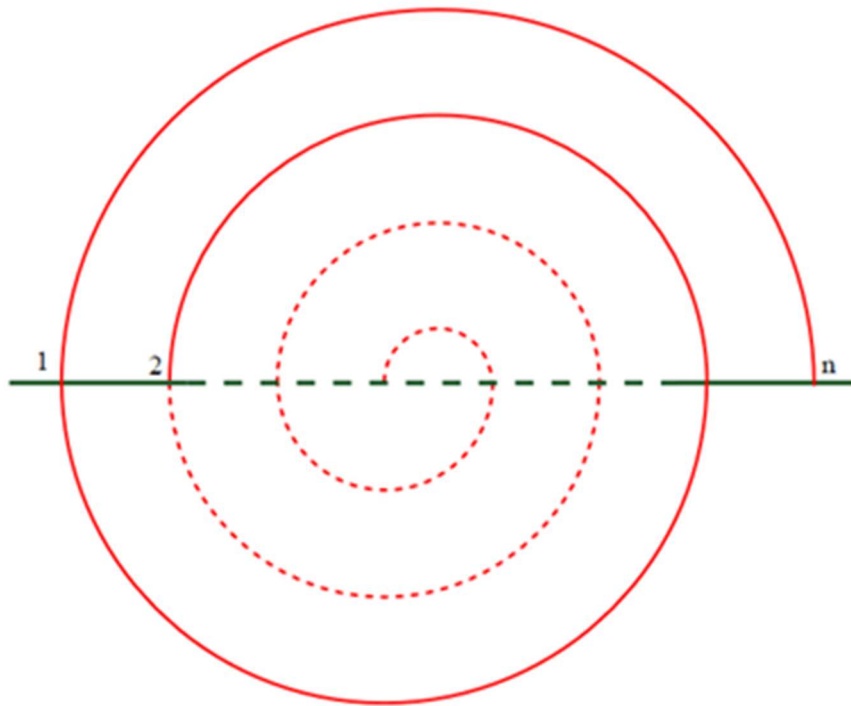
$$Z = (1, 2, 3, 4, 5, 6)$$

has been replaced by the Spiral number counting

$$Q = (6, 1, 5, 2, 4, 3)$$

Generally, a Queneau number is a Peano number, which can be shown by the following generalized Spiral model

¹ Named after the French poet, novelist and mathematician Raymond Queneau (1903-1976), cf. Queneau, Raymond, Sur les suites s-additives. In: Journal of Combinatorial Theory (A) 12, 1972, S. 31-72.



for which there exists a permutation σ for a set M of n riming words which is thus given by the order $n, 1, n-1, 2, \dots$ and can be defined by

$$\sigma(k) = 2k, \text{ if } 2k \leq n, \text{ otherwise } \sigma(k) = 2n + 1 - 2k.$$

2. Now, let us ask, for which integers n the permutation σ is a cycle of the order n and hence a Queneau number. As it is evident from the above model, we have

1 is a Queneau number

2 is a Queneau number

3 is a Queneau number.

In this way, especially the 3 prime-sign numbers, which had been defined by Bense for semiotics (cf. Bense 1981, pp. 17 ss.), can be shown as spiral-transformations.

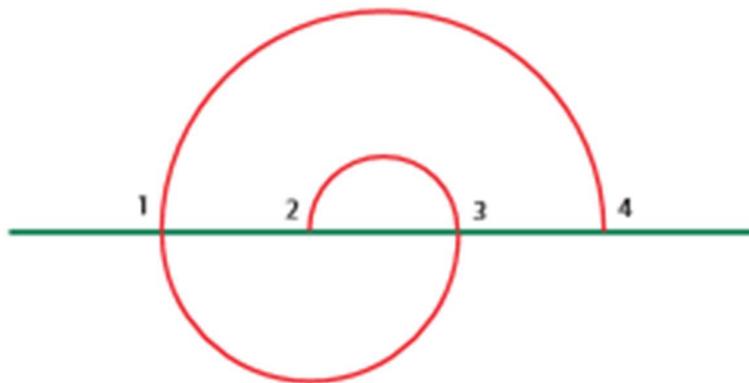
2. However, continuing the checking, whether the following Peano numbers are Queneau numbers or not, we get a surprise

4 is not a Queneau-number.

Catherines are actually the first non-Queneau numbers, since their permutation scheme

	1	2	3	4
σ	4	1	3	2

fixes 3; cf. the respective spiral model.



If we proceed, we find

- 5 is a Queneau number
- 6 is a Queneau number
- 7 is not a Queneau number
- 8 is not a Queneau number.

Now, as I have shown in Toth (2014), if we attempt at fulfilling Bense's intent to establish semiotics as a theory of communication in the sense of Shannon and Weaver's theory of information (cf. Bense 1971), we need to define semiotic automata, which possess the structural richness not only for one interpretant relation in order to code the I-Subject, but for two more interpretant relations to code also the Thou- and the He-subject (i.e., 1st, 2nd and 3rd grammatical person). However, this is not possible, since 5 and 6 are Queneau numbers, but 4 is not.

If we have a look at the Peano and the Queneau orders of the first 6 Peano numbers

Peano number	Peano order	Queneau order
1	1	1
2	1, 2	2, 1
3	1, 2, 3	<u>3, 1, 2</u>
4	1, 2, 3, 4	4, <u>1, 3, 2</u>
5	1, 2, 3, 4, 5	5, <u>1</u> , 4, <u>2, 3</u>
6	1, 2, 3, 4, 5, 6	6, <u>1</u> , 5, <u>2</u> , 4, <u>3</u>

we see, that Catherines are still behaving in a semiotic manner, insofar the three basic semiotic categories (1, 2, 3) are showing up without any juxtaposition of other values. However, 5-ines have 1 juxtaposition (1, 4, 2, 3), and 6-ines have 2 juxtapositions (1, 5, 2, 4, 3), both are thus not behaving in a semiotic manner and preventing further attempts to construct semiotic automata starting from 5-ines and 6-ines.

By the results of this little contribution to Queneau numbers, we have proven, that the relation of linear Peano order and spiral Queneau order is isomorphic between prime-sign numbers and Queneau numbers 1, 2, 3 only, i.e. for the first 3 semiotic categories, but not further. Nevertheless, hence, Queneau numbers with Catherines as their supremum show a new and hitherto never researched new field to calculate with semiotics numbers on a non-linear basis.

Literatur

Audin, Michèle, L'Oulipo et les mathématiques. In: Conférence à la médiathèque les Champs libres de Rennes le 20 octobre 2010, texte complété après la discussion qui a suivi la conférence.

Bense, Max, Zeichen und Design. Baden-Baden 1971

Bense Max, Axiomatik und Semiotik. Baden-Baden 1981

Toth, Alfred, Zu einer mehrwertigen semiotischen Automatentheorie. In:
Electronic Journal for Mathematical Semiotics, 2014

17.9.2017