DISSIPATIVE STOCHASTIC DYNAMIC MODEL FOR THE EVOLUTION OF WORD-FORMATION NESTS

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It is proposed a dissipative stochastic dynamical model of word-formation nests evolution. On this basis there is derived a shape for the distribution of words length in natural language. The model is an extension of the previously proposed a dissipative dynamical stochastic model of linguistic signs [1]. Feature of the proposed model is the consideration of the logic for word-formation process and deriving from it the general regularities of correlation of words and morphemes in their lengths in language [2]. The model in the form of a system of stochastic differential and difference equations has been built basing on the following assumptions: 1) of the Poisson nature of the stream of word-nests emergence as a stream of rare events, 2) of the exponential distribution of the associative word-formation potential (AWFP) of word-formation nests, 3) of the dissipative nature of the evolution of word-formation nests and morphemic structures of words.

This mathematical model allows a computer simulation of growth of word-formation nests, simultaneous distribution of nests volume over the quality processes (for the part of speech composition) of word-building nests, simultaneous distribution of nests of various grammatical quality of their members, the processes in nests of growth of word lengths, and finally, simultaneous distribution of lengths of all words in the language.

The model also allows to determine the parameters of these processes and synchronous distributions as derived from the relevant parameters of words derived from representative word-formation dictionaries.

References

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