LOTKA'S LAW AND AUTHORS' ACTIVITY
OF INZENERNO-FIZICHESKII ZHURNAL

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The results of statistical processing of the activity of Inzenerno-Fizicheskii Zhurnal (IFZh) authors have been given. It has been established that during 1996–2008, the average number of publications per author is equal to approximately 2, and Lotka's law describes well the nonuniformity in IFZh authors' activity.

Keywords: sample, Lotka's law, articles in IFZh.

The science of scientific literature has long used the empirical statistical Lotka's law [1, 2] on the distribution of the activity of authors of scientific journals, according to which the number of authors $A(n)$ who have contributed n articles to a journal decreases by the law n^{-2}.

Figure 1 shows the distribution of authors' activity as a function of the number of articles they wrote for IFZh. Using the IFZh authors' index, we have processed the list of authors whose names start with the letters P, S, and F. The list of such authors turned out to include 437 persons for 1996–2008 [3], so the size of the sample appears representative for certain statistical conclusions.

The share of the authors $C(n)$ who wrote n articles is calculated as $C(n) = A(n)/B$, where B is the total number of authors in the sample (in our example, $B = 437$).

In constructing a curve on the basis of Lotka's law, we used a single fitting parameter: the number of authors who have published only one article. The solid curve shows Lotka's law, whereas the dots indicate the actual data. It can be seen that the distribution of the obtained data is consistent with Lotka's law, especially for comparatively small values of n.

From the viewpoint of thermodynamics and physical kinetics, the composition of the body of IFZh authors is a strongly nonequilibrium non-Markovian system (a system with memory). Indeed, the power-law Lotka's distribution decreases much more slowly than the equilibrium exponential (Boltzmann) distribution.

One can see from the data given in the figure that the contribution of IFZh authors is extremely nonuniform: 286 authors with names starting with one of these three initial letters have published only one article each. As the
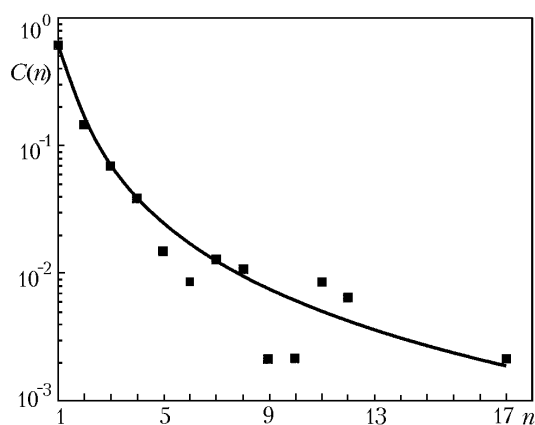

Fig. 1. Distribution of the activity of IFZh authors during 1996–2008.

processing of the data given in [3] shows, the average number of articles per author is approximately 2, and this parameter remains the same as the size of the considered sample increases.

It is significant that over this period of time, the authors from the considered sample who have published three or more articles in the past 12 years account for over 50% of all publications in IFZh by authors whose names start with P, S, and F. At the same time, they account for only 20% of the number of all authors. We believe that authors who have published three or more articles in the past 12 years are indeed a team of genuine activists of IFZh! It is reasonable to assume that the quality of articles contributed by activist authors is close to or above average.

Finally, there is a small group of authors demonstrating a high activity of publications in IFZh. To be part of this group, an author is assumed to have contributed eight or more publications in the years considered. This group includes about 3% of all authors, but it accounts for 20% of all publications.

Why is the share of authors who have published only one article in IFzh so great? Probably, a significant part of them is made up of specialists of industrial and design organizations, scientists of other specializations who have published one work, as a rule, in co-authorship, and who have been invited to contribute to the solution of comprehensive problems covered by the journal.

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