On December 8, **2016** the **Russian Highly Cited Researchers Award** ceremony was held for 14 Russian scientists [a,b,c]. The nominees' citation data was obtained from the Web of Science Core Collection database and was analyzed by the experts of Clarivate Analytics (Thomson Reuters), who estimated nominees' positions in scientific society. Both of the award winners **in Mathematics** are scientists from St. Petersburg: **Nikolay V. Kuznetsov** and **Gennady A. Leonov**.



The main task of the investigation of dynamical systems is the study of established (limiting) behavior of the system after transient processes, i.e., the problem of localization and analysis of attractors (limited sets of system's states, which are reached by the system from close initial data after transient processes). In the case when the transient process of the system with initial data from the neighborhood of stationary states leads to an attractor, this kind attractor is called a *self-excited attractor*. The appreciation of this process allows for effective numerical localization and visualization of such attractors. Another type of attractors is *hidden attractors* whose basin of attraction does not intersect with certain neighborhoods of stationary states. For example, a hidden attractor is the periodic or chaotic attractor in the system without equilibria or with the only stable equilibrium (a special case of multistability and coexistence of attractors). The *classification of attractors as "hidden/self-excited"* was introduced by G.A. Leonov and N.V. Kuznetsov in 2010 [1-5]. It allowed for connecting the notions of transient processes (engineering), visualization (numerical analysis), and basins of attraction and stability (dynamical systems). For example, a hidden attractor is the periodic or chaotic attractor in the system without equilibria or with the only stable equilibrium (a special case of multistability and coexistence of attractors). This classification not only demonstrated difficulties of fundamental problems and applied systems analysis, but also triggered the discovery of new hidden attractors in well-known physical and engineering models. Finding analytical criteria of the absence of hidden attractors or the development of effective numerical procedures for the search of hidden attractor is a difficult task (see, for example, counterexamples to the well-known Aizerman and Kalman conjectures on absolute stability of control systems and numerical localization of limit cycles in the 16th Hilbert problem [1]). The analysis of multistability (coexistence of attractors) and localization of hidden attractors has important applications since hidden attractors may lead to breakdowns and even crashes of engineering systems: the existence of hidden oscillations is connected with the well-known Sommerfeld effect (the rotational frequency of a motor's rotor gets stuck during start-up, thus the motor's full capacity is not reached), drilling systems failures, aircraft crashes, incorrect design of PLL (used in computer architecture, telecommunications and GPS/GLONASS), and other important applications [1-7].

The Leonov-Kuznetsov's classification *hidden vs self-excited attractors* captured much attention of scientists from around the world. In 2016, the first works on this subject became the most cited articles of the following journals (data from 08.12.2016):

[1] – in the list of the most cited articles (all the years) of the *International Journal of Bifurcation and Chaos* according to the journal website http://www.worldscientific.com/worldscinet/ijbc?journalTabs=cited,

[2] – the most cited article of one of the leading Russian academic journal - *Journal of Computer and Systems Sciences International*, according to Springer citations service http://citations.springer.com/search?query=Computer+and+Systems+Sciences+International,

[3] – the most cited *Physics Letters A* article (for the last five years, published since 2011) according to the journal web site http://www.journals.elsevier.com/physics-letters-a/most-cited-articles,

[4] – the most cited *Physica D: Nonlinear Phenomena* article (for the last five years, published since 2011) according to the journal website http://www.journals.elsevier.com/physica-d-nonlinear-phenomena/most-cited-articles.

In 2015, a survey article on analytical and numerical approaches to the study of hidden attractors was published in the special issue "*Multistability: Uncovering Hidden Attractors*" of *European Physical Journal Special Topics* [5] and a plenary lecture "*Hidden attractors in fundamental problems and engineering models*" was given at the *International Conference on Advanced Engineering – Theory and Applications* [6]. In 2016 comprehensive survey with results on hidden attractors was accepted for publication in one of the top-rated journals – *Physics Reports* [7].

**Papers**

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**c) "POISK" Russian weekly newspaper for the scientific community (Russian Academy of Science),** http://www.poisknews.ru/archive/2016/282/