PREFACE

In the 20th century both physics and cybernetics experienced tremendous growth and contributed a lot into the development of the modern science. However, no creative interaction of physics and control theory has been seen until recently and no control theory methods have been directly used for discovering new physical effects and phenomena. The situation has changed dramatically in the 1990s when two new research areas emerged: *control of chaos* and *quantum control*.

Since then thousands of papers were published that examine and predict properties of systems based on using control, identification and other cybernetic methods. This provides evidences for the existence of the new emerging field of research related to both physics and control, that may be called *Cybernetical Physics*.

Almost at the same time an interest in the application of cybernetic methods to the search of new physical effects has been observed in other fields of physics and mechanics, such as control of lasers, control of plasma, vibration control, control of particle beams, control in thermodynamics, etc. As a consequence, a number of control related papers in physical journals is currently growing rapidly. Similar growth of control theory applications can be observed in related natural sciences: chemistry, biology, etc.

The horizons of a new interdisciplinary area look almost infinitely broad and interest in it is growing rapidly. Applied studies stimulate a lot of basic research and cybernetical physics is an excellent example for this. At the present stage of its evolution it is important to increase the information exchange and dissemination of ideas between experts from different background and research areas. Existing media are definitely not sufficient. Evidence for this was provided by the success of the 1st International conference "Physics and Control" (Physcon 2003) that took place in August, 2003 in St.Petersburg, Russia with 250 experts from 32 countries participating. It was the opinion of many participants that it was necessary to organize another conference devoted to the same area. Then the 2nd International conference "Physics and Control" (Physcon 2005) took place in August, 2005, again in St.Petersburg, Russia. The program of the 2nd International Conference on Physics and Control (Physcon 2005) included 215 papers representing 33 countries and further confirmed the existence of stable interest in the common areas and a strong need for continuing information exchange among active researchers. To promote such an information exchange several experts suggested to establish a new international society under the name "The International Physics And Control Society" (IPACS). It was done at the IPACS Foundation meeting on August 26, 2005 in St.Petersburg, attended by more than 100 conference participants. More information about IPACS can be found at http://physcon.ru/.

Since then Physics and Control (Physcon) conferences took place under the IPACS umbrella in different countries: Physcon 2007 - in Potsdam, Germany on September, 3-7, 2007; Physcon 2009 - in Catania, Italy on September 1-4, 2009; Physcon 2011 - in Leon, Spain, on September 5-8, 2011. Each conference was attended by 200-250 scholars from about 30 countries. And many times participants were telling me that, in addition to the conferences it would be good to have an international journal providing facilities for archival publications in the area related to both physics and control. Now I am happy to introduce the first issue of this new journal named **Cybernetics and Physics** or CAP to the readers. The term 'cybernetics' in its title is understood as control in a broad sense and includes, in addition to control, such areas as estimation, filtering, optimization, identification, information theory, pattern recognition and other related areas. The CAP Editorial Board consists of about 30 internationally recognized experts from 17 countries. I believe we will be able to create a high level and high reputation international journal dedicated to an emerging field. I invite experts in related areas to submit their papers to our new journal. The papers in cybernetics with physical flavor as well as the papers in physics with cybernetic flavor are welcome. Our ultimate goal is to create a solid platform where mathematicians and control engineers could listen to each other and to exchange ideas with researchers from physics, chemistry, biology and other natural sciences.

Happy birthday, new journal!

Alexander Fradkov,
CAP Editor-in-Chief

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