

## Preface

# “Cybernetics And Physics”: Ten Years Online Together

Cybernetics and Physics are two very different sciences. Physics is the science studying Nature, while Cybernetics is closer to Engineering since it is often understood as control theory and practice in a broad sense. The age of physics transcends two millennia: the term “Physics”, meaning “Nature” in Greek was introduced by Aristotle. Cybernetics is much younger: although the term was also coined in Ancient Greece, the foundation of cybernetics as a science is associated with the publishing of Norbert Wiener’s seminal book in 1948 where cybernetics was defined as “the science of control and communication in the animal and the machine.” Wiener’s predecessors French physicist Andre-Marie Ampere and Polish philosopher Bronislaw Trentowski defined cybernetics in the middle of the 19th century in a related way as the science of governance or the science of administration. Today cybernetics can be understood in a broader sense, as science of control and communication in the Nature, Engineering and Society. The cybernetical methods include identification, estimation, filtering, information theory, optimization, pattern recognition, *etc.*

However, for better or worse, there was no significant interaction between physics and cybernetics until the 1990s. In the 1990s the situation has changed: such areas as the control and synchronization for chaotic systems, quantum control, and other physics and cybernetics related areas began to develop rapidly. In the 2000s the control and synchronization of complex networks were added to them. Mutual interest between Physics and Control communities has been increased and the 1st International Conference on Physics and Control (PhysCon 2003) took place in Saint Petersburg in 2003. In 2005, right after PhysCon 2005 a new International Physics and Control Society (IPACS) has been founded, again in Saint Petersburg.

Along with the growth of Physics and Control community the demand for a profilized publication media was growing. Finally at the IPACS meeting in 2011 the decision to organize a new journal was taken and the first issue of “Cybernetics and Physics” (CAP) was released in the beginning of 2012. The release of the current issue marks the first decade of the new journal history.

Initially the scope of the journal included such areas as

- Nonlinear dynamics and control
- Complexity and self-organization
- Control of oscillations
- Control of chaos and bifurcations
- Control in thermodynamics
- Control of flows and turbulence
- Information Physics
- Modeling and identification of physical systems
- Quantum information and control
- Analysis and control of complex networks
- Synchronization of systems and networks
- Control of mechanical and micromechanical systems
- Dynamics and control of plasma, beams, lasers, nanostructures
- Applications of cybernetic methods in chemistry, biology, other natural sciences

Later the recent trend of application of computer science studies in natural sciences and engineering was taken into account and the scope was expanded with such areas as

- Cyber-physical systems
- Artificial intelligence in natural sciences and in engineering

During the first decade 40 issues with 311 articles have been published. CAP is indexed in Scopus database since 2016. According to the SCIMAGO ranking it currently belongs to the Q3 quartile in the subject areas and categories of

- Chemical Engineering (Fluid Flow and Transfer Processes)
- Computer Science (Artificial Intelligence, Computer Vision and Pattern Recognition, Signal Processing)
- Mathematics (Control and Optimization)
- Physics and Astronomy (miscellaneous)

It is good to know that SJR index of CAP in 2021 is 0.365 compared 0.267 in 2020. It means that the number of citations in 2021 achieved its maximum value during the whole period of indexation by Scopus.

Summarizing, the scope of the journal is matching the recent trends in the field of Cybernetics and Physics. It gives hopes for growth of its attractivity for next generation of researchers.

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