PREFACE

This Special Issue of Cybernetics and Physics Journal (CAP) is entitled "Control And Linear Algebra: Theory And Applications". It collects highly selected papers which focus on both theoretical and practical system treatment by using time invariant linear systems. This special issue presents extended versions of relevant works presented in the invited minisymposium called "Control and Linear Algebra: Theory and Applications" held at 6th International Scientific Conference on Physics and Control (PhysCon 2013) on August, 26th–29th, 2013, which was organized by the University of San Luis de Potosí (México) and the International Physics and Control Society (IPACS).

To be more specific, this special issue includes the results discussed at the symposium of highly relevant open problems in Linear and Numerical Linear Algebra. It introduces a wide variety of related fields, including: controllability, control design, discrete events and switched systems.

The different topics proposed and explained by researchers are offered with the intention of generating further work and discussing, as well as inspiration for the treatment of many other similar problems. Moreover, in this edition a collection of various real-life applications of the linear algebra and of the control theory is presented.

It is well known what importance the control theory has acquired, and in particular the mathematical techniques used to not only model the real-life systems (physical, chemical, economic or biological systems, for example), but also to analyze and to control them.

The linear algebra theory is a good tool for linear time-invariant systems where linearity means that these systems obey the superposition principle, and time-invariance that the laws of the system do not depend explicitly on time. A large amount of linear systems for specific and classical examples can be found in literature. However, due to the potential of those tools, new systems are being developed in such a way. It is well known that controllability referring to the question of whether or not one trajectory of a dynamical system can be steered towards another one and observability referring to the question of what one can deduce from the observation of one set of system variables about the behavior of another set; these are important and classical properties in control theory. Linear Algebra theory plays a central role in the analysis of those properties. Also, this special issue explains and presents some application problems, considering both theoretical and application such as electric machine control design tools. Moreover, some applications of linear parameter-varying systems considering geometrical point of view and a new procedure to analyze all feedback classes of locally Brunovsky linear system are included in such special issue.

We would like to thank the authors efforts which have contributed with their papers to this special issue. Further, we want to emphasize that the choice of these papers increased the minisymposium quality and relevance.

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