EDITORIAL

In the last two decades considerable effort and progress have been made in the multidimensional systems theory and its applications. This issue summarises some recent developments in this field specially in the two-dimensional (2D) linear system theory. The issue comprises 10 contributions coming from all over the world. The first paper is devoted to 2D positive systems whose variables take only non-negative values and are described by a family of non-negative matrices. In the paper, the stability, asymptotic stability, positive realisation problem for 2D rational functions and 2D compartmental models are investigated. A survey of recent developments in the theory of repetitive processes with some new results is given in the paper by Rogers, Gałkowski and Owens. In Gregor's paper an abstract multi-dimensional discrete systems theory is formulated. Variable parameter systems, non-linear systems and discrete systems which cannot be treated on the common rectangular grid are studied. Regularisation problems of singular 2D systems by state and output feedbacks are investigated in the next two papers. Necessary and sufficient conditions are established under which the singular 2D systems can be regularised by state and output feedbacks. Procedures are presented for computing of the state and output feedback matrices. A survey of recent results concerning controllability of 2D systems is presented in Klamka's paper. The controllability of linear singular 2D systems with constant coefficients, 2D continuous-discrete linear systems, positive 2D systems and of non-linear 2D systems with constrained controls are considered. In Krason's paper methods are presented for computing of the support functions and diameters of reachability sets for 2D continuous-discrete linear systems with disturbances limited to rectangle and ellipsoid. In the paper by Rocha and Wood some properties of weak and strong controllability for multi-dimensional delay-differential systems in a behavioural setting are studied.

A comprehensive treatment of some theoretical and methodological results and possible applications for the control of nD systems with input and output signals unbounded it at most, one dimension is presented in the paper by Xu, Saito and Abe. It is shown that the method for 2D practical tracking control provides a general design approach for a class of iterative learning control systems and linear multipass processes.

Trzaska's paper introduces 2D polynomials with coefficients defined by modified numerical triangles. Fundamental properties of the 2D polynomials and some of their applications to analysis of 2D discrete-continuous linear systems are presented.

I hope that the reader will find the issue highly informative, thought-provoking and intellectually stimulating for further research.

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