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SYSTEMES LINEAIRES. VARIABLES D'ETAT

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System's theory is the discipline studying the analysis and synthesis of systems. It uses two basic methods: transfer functions method and state variables method.

The first method, well stated and used on a large scale, takes into consideration only system input values and system output values; this fact leading us to the conclusion that we do not study the system itself but system answer to the environment stimuli. This method applied to linear and invariant systems, is very adequate. But unfortunately, the method is not adequate for variable dynamic systems and particulary not for nonlinear system.

As these two kinds of systems (linear and nonlinear) are used on a large scale, the method of transfer function should also be used, by means of which the system is substituted by state variables this fact allowing the study of transformation secured within the system-sensibility, stability, control, optimizing.

Due to the possibilities of using the strong computation systems — computers — the method of state variables came more and more in several fields, among which: automatics, informatics, etc.

The first part of the paper is a monograph presenting the principles of state variables method in such a way as to allow the reader to further approach the study of speciality works.

To a better understanding, the author presents a single class of systems: continuous operating systems.

The used methods are "borrowed" from te field of electric circuits, they being the most known and used systems.

At the same time, the author approaches the principles of transfer functions method which allow a better understanding of states method.

The book also covers annexes very useful for remembering the essential mathematical notions necessary for understanding the presented problems. These annexes refer to Laplace transformation convolution notion, matrices and quadratic shapes.

The book addresses to all those dealling with the study of systems.

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