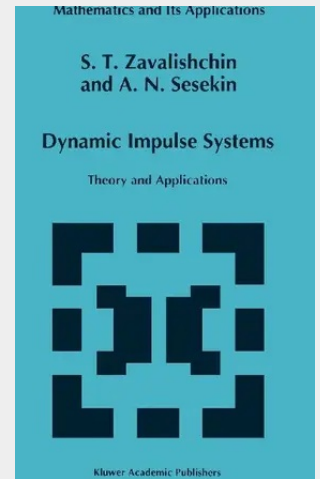


Dynamic Impulse Systems

Theory and Applications

A number of optimization problems of the mechanics of space flight and the motion of walking robots and manipulators, and of quantum physics, economics and biology, have an irregular structure: classical variational procedures do not formally make it possible to find optimal controls that, as we explain, have an impulse character. This and other well-known facts lead to the necessity for constructing dynamical models using the concept of a generalized function (Schwartz distribution). The problem of the systematization of such models is very important. In particular, the problem of the construction of the general form of linear and nonlinear operator equations in distributions is timely. Another problem is related to the proper determination of solutions of equations that have nonlinear operations over generalized functions in their description. It is well-known that "the value of a distribution at a point" has no meaning. As a result the problem to construct the concept of stability for generalized processes arises. Finally, optimization problems for dynamic systems in distributions need finding optimality conditions. This book contains results that we have obtained in the above-mentioned directions. The aim of the book is to provide for electrical and mechanical engineers or mathematicians working in applications, a general and systematic treatment of dynamic systems based on up-to-date mathematical methods and to demonstrate the power of these methods in solving dynamics of systems and applied control problems.

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