Shearer, J. Lowen; **Kulakowski, Bohdan T.**
Dynamic modeling and control of engineering systems. (English) Zbl 0756.93006
Maxwell Macmillan International Editions. New York: Macmillan Publishing Comp. xiii, 370 p. (1990).

This book concerns the mathematical modelling of typical engineering systems and it appears to be mainly conceived as a textbook for students in mechanical engineering. The basic properties and characteristics of various elementary components of mechanical, electrical, thermal and fluid systems are described and analyzed in details. From this, it is shown how to derive linear, continuous-time, state-space models of complex systems and the models are further used for analysis and for control designing. Basic issues like the role of integration and feedback in determining the dynamic performances of the systems, as well as the limitations due to linearization, are discussed and illustrated. The use of models in obtaining computer simulations is described. The last part, devoted to control systems, should be considered only as an introduction to the topic, to be further developed. Teachers using the book in courses should be advised that the use of a precise mathematical language has sometime been sacrificed for the sake of a sort of simplicity. However, an overall appreciable clarity of exposition is obtained. The book contains a large number of clarifying examples and problems.

Reviewer: G.Conte (Ancona)

MSC:

93A30 Mathematical modelling of systems (MSC2010)
93-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to systems and control theory

Keywords:

mathematical modelling; engineering systems; state-space models of complex systems; control designing; computer simulations; examples; problems