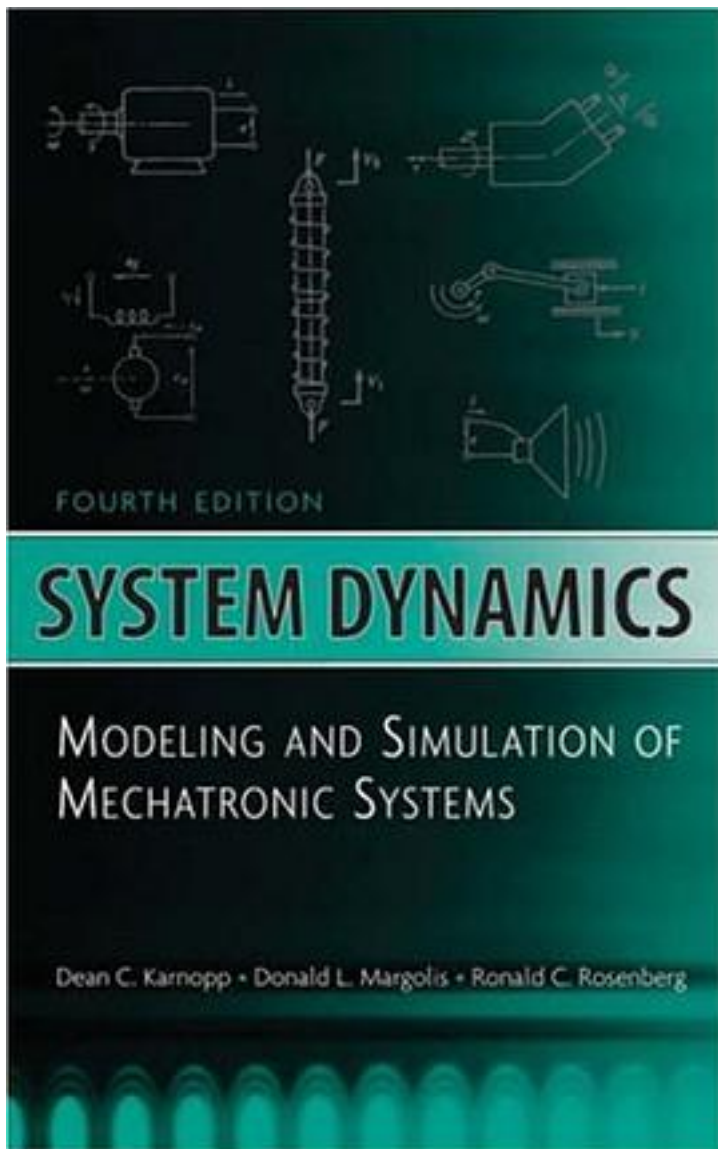


# System Dynamics



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A revision of the bestselling system dynamics book using the bond graph approach System Dynamics is a cornerstone resource for engineers faced with the evermore-complex job of designing mechatronic systems involving any number of electrical, mechanical, hydraulic, pneumatic, thermal, and magnetic subsystems. This updated Fourth Edition offers the latest coverage on one of the most important design tools today-bond graph modeling-the powerful, unified graphic modeling language. The only comprehensive guide to modeling, designing, simulating, and analyzing dynamic systems comprising a variety of technologies and energy domains, System Dynamics, Fourth Edition continues the previous edition's step-by-step approach to creating dynamic models. The first six chapters have been improved to make the material much more understandable for those unfamiliar with physical system modeling. The presentation starts with the basic elements and leads to sophisticated mathematical models suitable for automated computer simulation. The new edition incorporates the authors' vast experience in teaching the topics to undergraduate and graduate students over many years and features expanded coverage of topics including: New expositions of modeling methods for electrical, mechanical, and hydraulic systems New sections on mechanical systems in plane and three-dimensional motion New sections on hydraulic and acoustic systems This Fourth Edition continues to stress all the essentials-from basic hand formulation of simple bond graph models to the automatic simulation of complex mechatronic systems. It offers updated examples of multi-energy domain systems as well as: Discussions of state-of-the-art simulation software for use with bond graph models Presentations of a multiport modeling philosophy based on power and energy interactions Methods for understanding system characteristics and predicting system behaviors The use of graphical depictions of dynamic systems that can be translated automatically into complex mathematical models for computer simulation

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