

1. Record Nr.	UNINA9911027262703321
Autore	Longoria Raul G.
Titolo	Modeling of Physical Systems
Pubbl/distr/stampa	Hoboken, NJ : , : John Wiley & Sons Inc, , 2025 ©2025
ISBN	1118387619 1118387643 1118387635
Edizione	[First edition.]
Descrizione fisica	1 online resource
Altri autori (Persone)	Joseph J. Beaman
Soggetti	Systems engineering - Mathematical models Mechanics Electronic books
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Kirchhoff systems -- Physical modeling with bond graphs -- System model formulation and evaluation -- Linear system modeling and analysis -- Frequency response and impedance-based modeling -- Modeling feedback control systems -- Multiport modeling and energy methods -- Thermodynamic systems.
Sommario/riassunto	"Introductory text on nonlinear and continuous-time dynamic systems using bond graph methodology to enable readers to develop and apply physical system models. Through an integrated and uniform approach to system modeling, analysis, and control, Modeling of Physical Systems uses realistic examples to link empirical, analytical, and numerical approaches and provide readers with the essential foundation needed to move towards more advanced topics in systems engineering. Rather than use only a linear modeling methodology, this book also incorporates nonlinear modeling approaches. The authors approach the topic using bond graph methodology, a well-known and highly effective method for the modeling and analysis of multi-energy domain systems at the physical level. With a strong focus on fundamentals, this book begins by reviewing core topics which engineering students will have been exposed to in their first two years

of study. It then expands into introducing systematic model development using a bond graph approach. Later chapters expand on the fundamental understanding of systems, with insights regarding how to make decisions on what to model and how much complexity is needed for a particular problem. Written by two professors with nearly a century of combined research and industry experience, Modeling of Physical Systems explores topics including: Basic Kirchoff systems, covering mechanical translation and rotation, electrical, hydraulic, and thermal systems, and ideal couplers A complete introduction to bond graph methods and their application to practical engineering system modeling Computer-based analysis and simulation, covering algebraic analysis of system equation and semi-analytical analysis for linear system response Multiport fields, distributed systems and transmission elements, covering heat and magnetism power lines and wave propagation modeling with W- and H-Lines Signal and power in measurement and control, covering derivative control and effect of feedback Modeling of Physical Systems is an essential learning resource for mechanical, mechatronics, and aerospace engineering students at the graduate and senior graduate level. The text is also valuable for professional engineers and researchers, controls engineers, and computer scientists seeking an understanding of engineering system modeling." -- Publisher's description.
