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Now that modern machinery and electromechanical devices are typically being controlled using analog and digital electronics and computers, the technologies of mechanical engineering in such a system can no longer be isolated from those of electronic and computer engineering. Mechatronics: A Foundation Course applies a unified approach to meet this challenge, developing an understanding of the synergistic and concurrent use of mechanics, electronics, computer engineering, and intelligent control systems for everything from modeling and analysis to design, implementation, control, and integration of smart electromechanical products.

This book explains the fundamentals of integrating different types of components and functions, both mechanical and electrical, to achieve optimal operation that meets a desired set of performance specifications. This integration will benefit performance, efficiency, reliability, cost, and environmental impact. With useful features that distinguish it from other comparable books, this solid learning tool:

Prioritizes readability and convenient reference

Develops and presents key concepts and formulas, summarizing them in windows, tables, and lists in a user-friendly format

Includes numerous worked examples, problems, and exercises related to real-life situations and the practice of mechatronics

Describes and employs MATLAB®, Simulink®, LabVIEW®, and associated toolboxes, providing various illustrative examples for their use

Explores the limitations of available software tools and teaches the reader how to choose proper tools to solve a given problem and interpret and assess the validity of the results

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The text conveys the considerable experience that author Clarence de Silva gained from teaching mechatronics at the graduate and professional levels, as well as from his time working in industry for organizations such as IBM, Westinghouse Electric, and NASA. It systematically and seamlessly incorporates many different underlying engineering fundamentals into analytical methods, modeling approaches, and design techniques for mechatronics_all in a single resource.