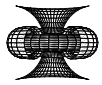
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BOOK REVIEW

Geometric Control of Mechanical Systems: Modeling, Analysis, and Design for Simple Mechanical Control Systems, by Francesco Bullo and Andrew D. Lewis, Springer Science+Buisiness Media Inc., 2005, xvi + 726pp, 64.15€, ISBN 0-387-22195-6

The book under review covers the theory and application of ideas in nonlinear control theory to mechanical systems, an area which has a great deal of progress during the past decade. The areas of application of control theory to mechanical systems include robotics and automation, autonomous vehicles in marine, aerospace, and other environments, flight control, problems in nuclear magnetic resonance, fluid mechanics, and etc. The authors say: *"Control theory for mechanics, and mechanics for control theory"*. In this aspect the book provides a background in geometric mechanics for researchers which are closed to geometric control theory and it is also a background in geometric nonlinear control for readers familiar with geometric mechanics. The book illustrates also to students a value of certain mathematical ideas in physical science and it helps them to pursue research in related field. For example, at the University of Illinois at Urbana-Champaign, this text has been used as an introduction to current research results on nonlinear control of mechanical systems.

The subtitle of the book points out that it consists of three parts: Modeling, Analysis and Design.

Part I – Modeling of Mechanical Systems.

This part begins with the words of Leonardo da Vinci:"*Mechanics is the paradise of the mathematical sciences, because by means of it one comes to the fruits of mathematics.*" There are no other words which describe so fully and deeply the ideas of the authors. *Chapter 1* gives introductory examples and problems concerning rigid body systems, manipulators and multi-body systems, constrained mechanical systems. *Chapter 2* suggests basic concepts and notation in the field of linear and multilinear algebra. Here one can read about sets, maps, vector spaces, inner products and bilinear maps, tensors. And since algebra and geome-