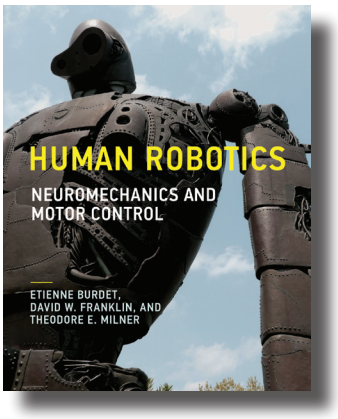
The MIT Press BOOK NEWS

$45.00/£31.95
October 2013
7 x 9, 304 pp.
104 b&w illus., 2 tables
(CLOTH)
ISBN: 9780262019538



Human Robotics

Neuromechanics and Motor Control

Etienne Burdet, David W. Franklin & Theodore E. Milner

This book proposes a transdisciplinary approach to investigating human motor control that synthesizes musculoskeletal biomechanics and neural control. The authors argue that this integrated approach—which uses the framework of robotics to understand sensorimotor control problems—offers a more complete and accurate description than either a purely neural computational approach or a purely biomechanical one.

The authors offer an account of motor control in which explanatory models are based on experimental evidence using mathematical approaches reminiscent of physics. These computational models yield algorithms for motor control that may be used as tools to investigate or treat diseases of the sensorimotor system and to guide the development of algorithms and hardware that can be incorporated into products designed to assist with the tasks of daily living.

The authors focus on the insights their approach offers in understanding how movement of the arm is controlled and how the control adapts to changing environments. The book begins with muscle mechanics and control, progresses in a logical manner to planning and behavior, and describes applications in neurorehabilitation and robotics. The material is self-contained, and accessible to researchers and professionals in a range of fields, including psychology, kinesiology, neurology, computer science, and robotics.

Etienne Burdet is Professor of Human Robotics in the Department of Bioengineering at the Imperial College of Science, Technology, and Medicine, London.

David W. Franklin is Wellcome Trust Career Development Fellow in the Department of Engineering at the University of Cambridge.

Theodore E. Milner is Professor in the Department of Kinesiology and Physical Education at McGill University.

"An outstanding resource for learning the fundamentals of computational motor control."
—Reza Shadmehr, Professor of Biomedical Engineering and Neuroscience, Johns Hopkins School of Medicine

"This book targets advanced undergraduate and graduate students in engineering, kinesiology, motor control, and computational neuroscience. A novel feature is that it embeds ideas about robotics and robotic controls into the broader framework of human motor control, helping the reader understand the mechanical and computational analogies between the two fields. The book is crisply written and uses mathematical rigor only when required, making it easy to read for students with differing backgrounds."
—William Zev Rymer, John G. Searle Professor of Rehabilitation Science and Vice President for Research, Rehabilitation Institute of Chicago; and Professor of Physiology, Biomedical Engineering, and Physical Medicine and Rehabilitation, Northwestern University

"This unique book offers a rigorous treatment of human movement by combining robotics, neuroscience, muscle physiology, kinesiology, and psychology. It provides information on neuroscience and kinesiology to roboticists interested in human movement and introduces the insights of robotics and neuroscience to kinesiologists. The book is timely as we enter the era of rehabilitation robotics and brain machine interface."
—Mitsuo Kawato, Advanced Telecommunication Research Institute