Contents

Preface .................................................................................. v
Credits ................................................................................... ix

Part I  Sensorimotor Integration ............................................. 1

Chapter 1  Action-Producing Frames of Reference for Motor Control ..................... 3
Francis G. Lestienne, Francine Thullier, and Anatol G. Feldman

Chapter 2  Computational Models and Geometric Approaches in Arm Trajectory Control Studies ................................................. 35
Tamar Flash, Magnus E. Richardson, Amir A. Handzel, and Dario G. Liebermann

Chapter 3  Development of Turning and Reaching ...................... 55
Patricia Bate and Esther Thelen

Part II  New Approaches to Motor Variability .......................... 81

Chapter 4  Dynamical Systems Approaches to Understanding the Generation of Movement by the Nervous System ..................... 83
Gregor Schöner

Chapter 5  Coordination of Multielement Motor Systems Based on Motor Abundance .............................. 97
Mark L. Latash, Frederic Danion, John F. Scholz, and Gregor Schöner

Chapter 6  On the Role of the Primary Motor Cortex in Arm Movement Control ................ 125
Emanuel Todorov
### Part III  Changes in Motor Control With Age or Neurological Disorder  .......... 167

#### Chapter 7  Postural Responses Triggered by Surface Perturbations Are Task Specific and Goal Directed  .................... 169

Joyce Fung, Rumpa Boonsinsukh, and Margherita Rapagna

#### Chapter 8  Balance Control and Protective Arm and Trunk Movements in the Elderly: Implications for Fall Prevention  ........... 183

John H.J. Allum, Mark G. Carpenter, and Bastiaan R. Bloem

#### Chapter 9  Signs of Long-Term Adaptation to Permanent Brain Damage As Revealed by Prehension Studies of Children With Spastic Hemiparesis  ... 207

Bert Steenbergen and Ruud G.J. Meulenbroek

### Part IV  Motor Rehabilitation After Stroke or Spinal Cord Injury  ............ 235

#### Chapter 10  Optimizing Locomotor Function With Body Weight Support Training and Functional Electrical Stimulation  ............... 237

Hugues Barbeau, Anouk Lamontagne, Michel Ladouceur, Isabelle Mercier, and Joyce Fung

#### Chapter 11  Spinal Locomotor Capability Revealed by Electrical Stimulation of the Lumbar Enlargement in Paraplegic Patients  .............. 253

Elena Yu. Shapkova

#### Chapter 12  Motor Control and Learning After Stroke: A Review  .................. 291

Mindy F. Levin

Index  .................................................. 315

Contributors  .......................................... 323

d the Editors  ........................................ 325