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Autore	Chen Cheng-Hung
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Nota di contenuto	FUSION OF HARD AND SOFT CONTROL STRATEGIES FOR THE ROBOTIC HAND; Contents; List of Tables; List of Figures; 1 Introduction; 1.1 Relevance to Military; 1.2 Control Strategies; 1.2.1 Prosthetic/Robotic Hands; 1.2.2 Chronological Overview; 1.2.3 Overview of Main Control Techniques Since 2007; 1.2.4 Revolutionary Prosthesis; 1.3 Fusion of Intelligent Control Strategies; 1.3.1 Fusion of Hard and Soft Computing/Control Strategies; 1.4 Overview of Our Research; 1.5 Developments in Neuroprosthetics; 1.6 Chapter Summary; 2 Kinematics and Trajectory Planning; 2.1 Human Hand Anatomy 2.2 Forward Kinematics2.2.1 Homogeneous Transformations; 2.2.2 Serial n Link Revolute Joint Planar Manipulator; 2.2.3 Two Link Thumb; 2.2.4 Three Link Index Finger; 2.2.5 Three Dimensional Five Fingered Robotic Hand; 2.3 Inverse Kinematics; 2.3.1 Two Link Thumb; 2.3.2 Three Link Fingers; 2.3.3 Fingertip Workspace; 2.3.3.1 Two Link Thumb and Three Link Index Finger; 2.3.3.2 Five Fingered Robotic Hand; 2.4 Differential Kinematics; 2.4.1 Serial Link Revolute Joint Planar Manipulator; 2.4.1.1 Some Properties of Rotation Matrices; 2.4.1.2 Rigid Body Kinematics; 2.4.2 Two Link Thumb 2.4.3 Three Link Index Finger2.5 Trajectory Planning; 2.5.1 Trajectory Planning Using Cubic Polynomial; 2.5.2 Trajectory Planning Using Cubic Baezier Curve; 2.5.3 Simulation Results of Trajectory Paths; 3 Dynamic

Sommario/riassunto	An in-depth review of hybrid control techniques for smart prosthetic hand technology by two of the world's pioneering experts in the field Long considered the stuff of science fiction, a prosthetic hand capable of fully replicating all of that appendage's various functions is closer to becoming reality than ever before. This book provides a comprehensive report on exciting recent developments in hybrid control techniques - one of the most crucial hurdles to be overcome in creating smart prosthetic hands. Coauthored by two of the world's foremost pioneering experts in the field, Fusion of Hard and Soft Control Strategies for the Robotic Hand treats robotic hands for multiple applications. It begins with an overview of advances in main control techniques that have been made over the past decade before addressing the military context for affordable robotic hand technology with tactile and/or proprioceptive feedback for hand amputees. Kinematics, homogeneous transformations, inverse and differential kinematics, trajectory planning, and dynamic models of two-link thumb and three-link index finger are discussed in detail. The remainder of the book is devoted to the most promising soft computing techniques, particle swarm optimization techniques, and strategies combining hard and soft controls. In addition, the book: . Includes a report on exciting new developments in prosthetic/robotic hand technology, with an emphasis on the fusion of hard and soft control strategies. Covers both prosthetic and nonprosthetic hand designs for everything from routine human operations, robotic surgery, and repair and maintenance, to hazardous materials handling, space applications, explosives disposal, and more. Provides a comprehensive overview of five-fingered robotic hand technology kinematics, dynamics, and control. Features detailed coverage of important recent developments in neuroprosthetics Fusion of Hard and Soft Control Strategies for the Robotic Hand is a must-read for researchers in control engineering, robotic engineering, biomedical sciences and engineering, and rehabilitation engineering.