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| Nota di contenuto | Front Cover; Introduction to Mobile Robot Control; Copyright Page; Dedication; Contents; Preface; List of acknowledged authors and collaborators; Principal symbols and acronyms; Quotations about robotics; 1 Mobile Robots: General Concepts; 1.1 Introduction; 1.2 Definition and History of Robots; 1.2.1 What Is a Robot?; 1.2.2 Robot History; 1.2.2.1 Ancient and Preindustrial Period; 1.2.2.2 Industrial and Robosapien Period; 1.3 Ground Robot Locomotion; 1.3.1 Legged Locomotion; 1.3.2 Wheeled Locomotion; 1.3.2.1 Wheel Types; 1.3.2.2 Drive Types; 1.3.2.3 WMR Maneuverability; References<br>2 Mobile Robot Kinematics 2.1 Introduction; 2.2 Background Concepts; 2.2.1 Direct and Inverse Robot Kinematics; 2.2.2 Homogeneous Transformations; 2.2.3 Nonholonomic Constraints; 2.3 Nonholonomic Mobile Robots; 2.3.1 Unicycle; 2.3.2 Differential Drive WMR; 2.3.3 Tricycle; 2.3.4 Car-Like WMR; 2.3.5 Chain and Brockett-Integrator Models; 2.3.5.1 Unicycle WMR; 2.3.5.2 Rear-Wheel Driving Car; 2.3.6 Car-Pulling Trailer WMR; 2.4 Omnidirectional WMR Kinematic Modeling; 2.4.1 Universal Multiwheel Omnidirectional WMR; 2.4.2 Four-Wheel Omnidirectional WMR with Mecanum Wheels; References<br>3 Mobile Robot Dynamics 3.1 Introduction; 3.2 General Robot Dynamic Modeling; 3.2.1 Newton-Euler Dynamic Model; 3.2.2 Lagrange Dynamic |

Model; 3.2.3 Lagrange Model of a Multilink Robot; 3.2.4 Dynamic Modeling of Nonholonomic Robots; 3.3 Differential-Drive WMR; 3.3.1 Newton-Euler Dynamic Model; 3.3.2 Lagrange Dynamic Model; 3.3.3 Dynamics of WMR with Slip; 3.4 Car-Like WMR Dynamic Model; 3.5 Three-Wheel Omnidirectional Mobile Robot; 3.6 Four Mecanum-Wheel Omnidirectional Robot; References; 4 Mobile Robot Sensors; 4.1 Introduction; 4.2 Sensor Classification and Characteristics
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5.3.4.1 Resolved Motion Rate Control

Sommario/riassunto

Introduction to Mobile Robot Control provides a complete and concise study of modeling, control, and navigation methods for wheeled non-holonomic and omnidirectional mobile robots and manipulators. The book begins with a study of mobile robot drives and corresponding kinematic and dynamic models, and discusses the sensors used in mobile robotics. It then examines a variety of model-based, model-free, and vision-based controllers with unified proof of their stabilization and tracking performance, also addressing the problems of path, motion, and task planning, along with localization