1. Record Nr. UNINA9910830291003321 Hybrid control and motion planning of dynamical legged locomotion / / Titolo Nasser Sadati [and three others] Pubbl/distr/stampa Piscatagay, J:,: IEEE Press,, [2012] **ISBN** 1-118-39372-4 1-118-39374-0 1-283-59324-6 9786613905697 1-118-39370-8 Descrizione fisica 1 online resource (286 pages) Collana IEEE press series on systems science and engineering;; 2 Altri autori (Persone) SadatiNasser Disciplina 629.8/932 629.8932 Soggetti Mobile robots Robots - Motion Walking Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Preface ix -- 1. Introduction 1 -- 1.1 Objectives of Legged Locomotion and Challenges in Controlling Dynamic Walking and Running 1 -- 1.2 Literature Overview 4 -- 1.2.1 Tracking of Time Trajectories 4 -- 1.2.2 Poincar'e Return Map and Hybrid Zero Dynamics 5 -- 1.3 The Objective of the Book 7 -- 1.3.1 Hybrid Zero Dynamics in Walking with Double Support Phase 7 -- 1.3.2 Hybrid Zero Dynamics in Running with an Online Motion Planning Algorithm 8 -- 1.3.3 Online Motion Planning Algorithms for Flight Phases of Running 9 -- 1.3.4 Hybrid Zero Dynamics in 3D Running 10 -- 1.3.5 Hybrid Zero Dynamics in Walking with Passive Knees 11 -- 1.3.6 Hybrid Zero Dynamics with Continuous-Time Update Laws 12 -- 2. Preliminaries in Hybrid Systems 13 -- 2.1 Basic Definitions 13 -- 2.2 Poincar'e Return Map for Hybrid Systems 16 -- 2.3 Low-Dimensional Stability Analysis 23 -- 2.4 Stabilization Problem 28 -- 3. Asymptotic Stabilization of Periodic Orbits for Walking with Double Support Phase 35 -- 3.1 Introduction 35 -- 3.2 Mechanical

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Sommario/riassunto

"This book provides a comprehensive presentation of issues and challenges faced by researchers and practicing engineers in motion planning and hybrid control of dynamical legged locomotion. The major features range from offline and online motion planning algorithms to generate desired feasible periodic walking and running motions and tow-level control schemes, including within-stride feedback laws, continuous time update laws and event-based update laws, to asymptotically stabilize the generated desired periodic orbits. This book describes the current state of the art and future directions across all domains of dynamical legged locomotion so that readers can extend proposed motion planning algorithms and control methodologies to other types of planar and 3D legged robots"-"This book provides a comprehensive presentation of issues and challenges faced by researchers and practicing engineers in motion planning and hybrid control of dynamical legged locomotion"--