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Sommario/riassunto

This book focuses on the design of a multi-criteria automated vehicle longitudinal control system as an enhancement of the adaptive cruise control system. It analyses the effects of various parameters on the average traffic speed and the traction force of the vehicles in mixed traffic from a macroscopic point of view, and also demonstrates why research and development in speed control and predictive cruise control is important. The book also summarises the main steps of the system's robust control design, from the modelling to its synthesis, and discusses both the theoretical background and the practical computation method of the control invariant sets. The book presents the analysis and verification of the system both in a simulation environment and under real-world conditions. By including the systematic design of the predictive cruise control using road and traffic information, it shows how optimization criteria can lead to multiobjective solutions, and the advanced optimization and control design methods required. The book focuses on a particular method by which the unfavourable effect of the traffic flow consideration can be reduced. It also includes simulation examples in which the speed design is performed, while the analysis is carried out in simulation and visualization environments. This book is a valuable reference for researchers and control engineers working on traffic control, vehicle control and control theory. It is also of interest to students and academics as it provides an overview of the strong interaction between the traffic flow and an individual vehicle cruising from both a microscopic and a macroscopic point of view.