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| Nota di contenuto | Chapter 1: Introduction to Collective Machine Behavior -- Chapter 2: Second-Order Min-Consensus -- Chapter 3: Consensus of High-Order Discrete-Time Multi-Agent Systems -- Chapter 4: Continuous-Time Biased Min-Consensus -- Chapter 5: Discrete-Time Biased Min-Consensus -- Chapter 6: Biased Consensus Based Distributed Neural Network -- Chapter 7: Predictive Suboptimal Consensus -- Chapter 8: Adaptive Near-Optimal Consensus. |
| Sommario/riassunto | In this book, we present our systematic investigations into consensus in multi-agent systems. We show the design and analysis of various types of consensus protocols from a multi-agent perspective with a focus on min-consensus and its variants. We also discuss second-order and high-order min-consensus. A very interesting topic regarding the link between consensus and path planning is also included. We show that a biased min-consensus protocol can lead to the path planning phenomenon, which means that the complexity of shortest path planning can emerge from a perturbed version of min-consensus protocol, which as a case study may encourage researchers in the field of distributed control to rethink the nature of complexity and the distance between control and intelligence. We also illustrate the design and analysis of consensus protocols for nonlinear multi-agent systems derived from an optimal control formulation, which do not require solving a Hamilton-Jacobi-Bellman (HJB) equation. The book was |

written in a self-contained format. For each consensus protocol, the performance is verified through simulative examples and analyzed via mathematical derivations, using tools like graph theory and modern control theory. The book’s goal is to provide not only theoretical contributions but also explore underlying intuitions from a methodological perspective.