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2.3.1. Representation of the parametric uncertainty; 2.3.2. Families of polynomials; 2.4. Bibliography; Chapter 3. Multiagent Coordination Strategies; 3.1. Introduction; 3.2. Controllability and observability of interconnections; 3.2.1. Cyclic topology; 3.2.2. Chain topology: input and output on agent 1; 3.2.3. Chain topology: input and output on agent 2; 3.2.4. Eigenvalues and eigenvectors of the system; 3.2.5. General case; 3.2.6. The cyclic topology in the general case; 3.2.6.1. Observability; 3.2.6.2. Controllability; 3.2.7. The chain topology in the general case; 3.2.7.1. Controllability; 3.2.7.2. Observability; 3.2.8. Combinations of chain and cyclic topologies; 3.2.8.1. Controllability; 3.2.8.2. Observability; 3.2.9. Simple configurations that are either non-controllable or non-observable; 3.2.9.1. Example 1; 3.2.9.2. Example 2; 3.2.9.3. Example 3; 3.2.9.4. Example 4; 3.2.9.5. Example 5; 3.3. Formation leader tracking; 3.3.1. Formation leader tracking in the general case; 3.3.2. Observer design; 3.3.3. Simulations; 3.4. Time-varying trajectory tracking; 3.5. Linear high-order multiagent consensus; 3.5.1. Trajectory-tracking control; 3.6. Conclusion; 3.7. Bibliography; Chapter 4. Robust Control Design of Multiagent Systems with Parametric Uncertainty; 4.1. Introduction; 4.2. Robust control design; 4.3. Robust stability analysis; 4.3.1. Robust strict positive realness; 4.3.2. Robust absolute stability; 4.4. Robust stability of time-delay systems; 4.5. Application to multiagent systems; 4.5.1. Cyclic topology; 4.5.2. Chain topology; 4.5.3. Balanced graph topology; 4.6. Conclusions; 4.7. Bibliography; Chapter 5. On Adaptive and Robust Controlled Synchronization of Networked Robotic Systems on Strongly Connected Graphs; 5.1. Summary; 5.2. Introduction; 5.3. Problem formulation; 5.4. Adaptive controlled synchronization on strongly connected graphs; 5.4.1. Delay-free synchronization; 5.4.2. Synchronization with time delay; 5.5. Robust controlled synchronization on strongly connected graph; 5.5.1. Delay-free synchronization; 5.5.2. Synchronization with time delay; 5.6. Numerical examples; 5.6.1. Adaptive tracking algorithm; 5.6.2. Robust tracking algorithm; 5.6.3. Disturbances; 5.7. Conclusions; 5.8. Appendix; 5.8.1. Robotic system; 5.8.2. Graph theory; 5.9. Bibliography; Chapter 6. Modeling and Control of Mini UAV; 6.1. Introduction; 6.2. General model

## Sommario/riassunto

In the last decade the development and control of Unmanned Aerial Vehicles (UAVs) has attracted a lot of interest. Both researchers and companies have a growing interest in improving this type of vehicle given their many civilian and military applications. This book presents the state of the art in the area of UAV Flight Formation. The coordination and robust consensus approaches are presented in detail as well as formation flight control strategies which are validated in experimental platforms. It aims at helping students and academics alike to better understand what coordination and