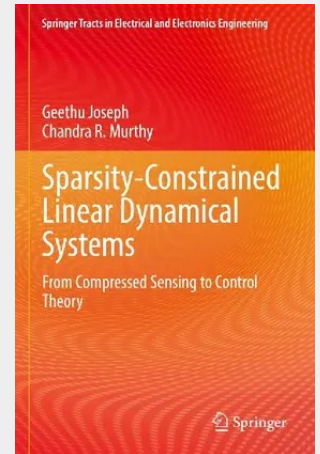


Sparsity-Constrained Linear Dynamical Systems

From Compressed Sensing to Control Theory

This volume provides a comprehensive overview of recent research advances in the upcoming field of sparse control and state estimation of linear dynamical systems. The contents offer a detailed introduction to the subject by combining classical control theory and compressed sensing. It covers conceptual foundations, including the formulation, theory, and algorithms, and outlines numerous remaining research challenges. Specifically, the book provides a detailed discussion on observability, controllability, and stabilizability under sparsity constraints. It also presents efficient, systematic, and rigorous approaches to estimating the sparse initial states and designing sparse control inputs. It also gives background materials from real analysis and probability theory and includes applications in network control, wireless communication, and image processing. It serves as a compendious source for graduate students and researchers in signal processing and control systems to acquire a thorough understanding of the underlying unified themes. The academic and industrial professionals working on the design and optimization of sparsity-constrained systems also benefit from the exposure to the array of recent works on linear dynamical systems and related mathematical machinery.

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