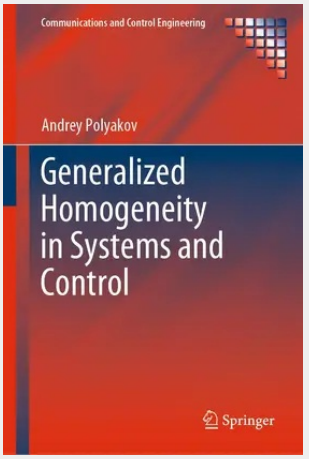
Polyakov

Generalized Homogeneity in Systems and Control



This monograph introduces the theory of generalized homogeneous systems governed by differential equations in both Euclidean (finite-dimensional) and Banach/Hilbert (infinite-dimensional) spaces. It develops methods of stability and robustness analysis, control design, state estimation and discretization of homogeneous control systems. Generalized Homogeneity in Systems and Control is structured in two parts. Part I discusses various models of control systems and related tools for their analysis, including Lyapunov functions. Part II deals with the analysis and design of homogeneous control systems. Some of the key features of the text include: - mathematical models of dynamical systems in finite-dimensional and infinite-dimensional spaces; - the theory of linear dilations in Banach spaces; - homogeneous control and estimation; - simple methods for an "upgrade" of existing linear control laws; - numerical schemes for a consistent digital implementation of homogeneous algorithms; and - experiments confirming an improvement of PID controllers. The advanced mathematical material will be of interest to researchers, mathematicians working in control theory and mathematically oriented control engineers.

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