

Symmetries, Stability, and Control in Nonlinear Systems and Networks

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This paper discusses the interplay of symmetries and stability in the analysis and control of nonlinear dynamical systems and networks. Specifically, it combines standard results on symmetries and equivariance with recent convergence analysis tools based on nonlinear contraction theory and virtual dynamical systems. This synergy between structural properties (symmetries) and convergence properties (contraction) is illustrated in the contexts of network motifs arising e.g. in genetic networks, of invariance to environmental symmetries, and of imposing different patterns of synchrony in a network.

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