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Repetitive control for nonlinear systems

Tuesday, October 17, 2023 3:00 PM (1 hour)

In this talk we revise a series of recent advances on the challenging problem of robust periodic output regulation, that is, the problem of tracking periodic references (and/or rejection periodic disturbances) for nonlinear systems, robustly with respect to model uncertainties. This problem is well understood in the context of linear systems thanks to the celebrated "internal-model principle" established during the 70's. But, for nonlinear systems, it is still open. This work aim at clarifying challenging and possible solutions, connecting the theory of repetitive control with output regulation by means of infinite-dimensional dynamic regulators. In this context, a strong connection between the output regulation problem and the theory of repetitive control is established. Finally, we propose a new feedback design for a repetitive control scheme for minimum-phase nonlinear systems. Such a scheme is based on the forwarding approach and allows to deal with systems with high-order relative degree between the input and the regulated output.

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