学术报告会

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Revisiting Sampled-Data Control Systems—The Importance of Intersample Behaviour Optimisation and Future Perspectives

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摘要:

Many practical control problems, including robot control, involve sampled-data control systems. Traditionally, controllers are designed in continuous time and then discretised, or the plant is discretised first, followed by discrete-time controller design. However, these approaches may fail to achieve satisfactory performance in actual sampled-data systems. Particularly in discrete-time design, the loss of intersample information often leads to significant steady-state ripple. These challenges were addressed through the introduction of continuous-time lifting in the 1990s, forming the basis of modern sampled-data control theory. Nonetheless, its adoption in practice remains limited. On the other hand, optimising intersample behaviour is deeply connected to stability in multi-robot control systems, an area of active research. In this talk, after outlining modern sampled-data control theory, we will introduce recent advancements, including methods for controlling signals beyond the Nyquist frequency and extensions to nonlinear lifting.

简介:

Kaoru Yamamoto received the bachelor's and master's degrees in architectural engineering from Kyoto University, Japan, in 2009 and 2011, respectively, and the Ph.D. degree in control engineering from the University of Cambridge, UK, in 2016, supported by the Funai Overseas Scholarship and the Cambridge Overseas Trust. She subsequently worked as a postdoctoral researcher at the University of Minnesota Twin Cities, USA, and Lund University, Sweden. In 2018, she joined the Faculty of Information Science and Electrical Engineering, Kyushu University, Japan, where she currently serves as an associate professor.
Her research interests include multi-agent systems, swarm robotics, sampled-data systems, cyber-physical systems, and systems theory.