

Stability of Model Predictive Control: a review and New Results

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Monday 18 January 2020

2pm

Abstract:

It is well known that optimality does not imply stability. A related question which perhaps is more important from a practical point view is: when does optimality imply stability? This question is relevant to many control and decision making methods including model predictive control (MPC). It is becoming ever more important since more and more artificial intelligence (AI) enabled functions are embedded in real-time control and decision loops and optimisation/search methods are behind many AI algorithms. This talk reviews the 30 years journey in the development of stability theory for MPC and recent progress. New stability theory will be presented which provides a better way in achieving stability guarantee for MPC of any length of horizon without the need of adding a terminal weight in the cost function for online optimisation. Numerical examples will be presented to illustrate the new stability analysis tools.