M14: Model Predictive Control

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Course description:

Model Predictive Control (MPC) has developed considerably in the last decades both in industry and in academia. This success is due to the fact that Model Predictive Control is perhaps the most general way of posing the control problem in the time domain and its ability to handle constraints and multivariable processes. Although the technique originated in industry, the academic research community has contributed, during the last two decades, important results, specially in the stability domain. Although MPC is considered to be a mature discipline, the field has still many open problems and attracts the attention of many researchers.

This courses provides an extensive review concerning the theoretical and practical aspects of predictive controllers. It describes the most commonly used MPC strategies, especially, showing both the theoretical properties and their practical implementation issues. Topics such as multivariable MPC, constraints handling, stability and robustness properties, fast realizations, tracking, multi-objective, hybrid and stochastic MPC are dealt with in the course.

	Eduardo F. Camacho received his doctorate in Electrical engineering from the University of Seville where he is now a full professor of the Department of System Engineering and Automatic Control. He has written the books: “Model Predictive Control in the Process industry” (1995), “Advanced Control of Solar Plants” (1997) and “Model Predictive Control” (1999), (2004 second edition) published by Springer-Verlag, “Control e Instrumentación de Procesos Quimicos” published by Ed. Sintesis and “Control of Dead-time Processes” published by Springer-Verlag (2007). He is one of the editors of the IFAC journal, Control Engineering Practice, editor at large of the European Journal of Control and subject editor of the journal Optimal Control: Methods and Applications.