Modeling And Predictive Control For Autonomous Vehicles

Abstract

The concept of prediction is ideal for applications with known future references. The main advantages of predictive control, which is more commonly used in industry, compared to classical control, are that it works better with multivariable problems, it considers constraints on the input and the state explicitly in its formulation, and it has better robustness characteristics adapting well to disturbances, nonlinearities, and modeling errors due to the moving horizon scheme.

This talk will be focused on the following topics:

• Modeling and Friction Estimation for Wheeled Mobile Robots

• Design of Model-Predictive Control With Friction Compensation

• Non-linear Model Predictive Control for Multi-Robot Systems

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Andre Scolari received the B.S. and M.S. degrees in Electrical Engineering from the Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil, in 2001 and 2004, respectively, and the Ph.D. degree in Electrical and Computer Engineering from Oporto University, Oporto, Portugal, in 2007. In 2009, he joined the Department of Electrical Engineering, Federal University of Bahia, Salvador, Brazil, as an Assistant Professor, and is currently a member of the Electrical Engineering Postgraduate Program. In 2013, he spent a sabbatical year in the School of Electrical Engineering and Computer Science - Queensland University of Technology - QUT, Brisbane, Australia. His main research interests include autonomous mobile robots, multi-robot systems, sensor fusion, state and parameter estimation, and process control.