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Discontinuous Integral Control of 2nd Order Systems

Kolloquium

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de México (UNAM)

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Zusammenfassung

For second order systems, i.e. systems with relative degree two, we present a controller able to track an unknown smooth signal, converging in finite time and by means of a continuous control signal. The control scheme is insensitive against unknown perturbations with bounded derivative. The controller consists of a non locally Lipschitz-continuous state feedback control law, and a discontinuous integral controller, that is able to estimate the unknown perturbation and to compensate it. To complete an output feedback control a continuous observer for the unmeasured variable is added. It is shown that the closed loop consisting of state feedback, state observer and discontinuous integral controller has an equilibrium point that is globally, finite time stable, despite of perturbations with bounded derivative. The proof is based on a new smooth Lyapunov function.

Curriculum Vitae

Prof. Moreno Pérez was born in Medellín, Colombia. He received his PhD degree in Electrical Engineering (Automatic Control) from Helmut-Schmidt University in Hamburg in 1995. Before that, in 1990 he received the Dipl.-Ing. Degree in Electrical Engineering (Automatic Control) from Universität zu Karlsruhe, and 1987 the Licentiate Degree in Electronics Engineering from Universidad Pontificia Bolivariana in Medellín, Colombia. He is a Full Professor of Automatic Control and Head of the Electric and Computer Science Department at the Institute of Engineering, UNAM, in Mexico City. He is member of various technical boards of IFAC. He is author and editor of 8 books, 4 book chapters, and co-authored more than 300 papers in refereed journals and conference proceedings. His current research interests include robust and non-linear control with application to biochemical processes, the design of nonlinear observers and higher order sliding mode control.