

Modeling and Control

Chairs: Richard Klafter, Imre Rudas

A New Data Fusion Method and its Application to State Estimation of Nonlinear Dynamic Systems

Jae-Won Lee and Sukhan Lee
Samsung Advanced Institute of Technology

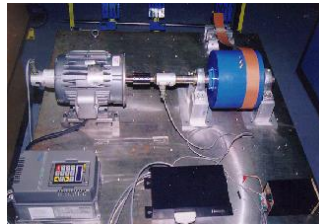
Non-Conventional Integration of the Fundamental Elements of Soft Computing and Traditional Methods in Adaptive Robot Control

I. J. Rudas, J. K. Tar, J. F. Bito and K. Kozłowski
Bnki Dont Polytechnic

Advanced Torque Control of Robot Manipulators Driven by AC Induction Motors

Dong Sun and James K. Mills
University of Toronto

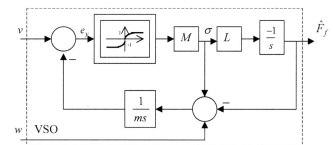
- Demand for the design of a feasible control method for AC induction motors which can exhibit better motion performance than PID.
- A torque feed-forward plus a PI-type torque feedback control.
- The implementation is greatly simplified through linearization of the torque dynamics while making partial compensation via current feedback and flux estimation.
- Experiments conducted on a commercial AC induction servo system demonstrate the effectiveness of the proposed torque control method.



Variable Structure Systems Approach to Friction Estimation and Compensation

Q. P. Ha, A. Bonchis, D. C. Rye and H. F. Durrant-Whyte
The University of Sydney

- Using a VSS-based technique in designing observers for friction estimation and compensation
- Model-based approach: VSO for friction compensation with and without velocity information
- Non model-based approach: Friction cancellation with a robust sliding mode controller
- Robustness verified with friction of both static and dynamic types

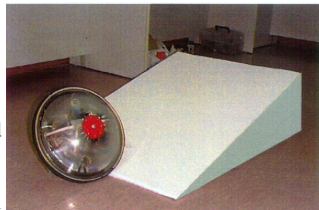


$$\begin{aligned}\dot{\hat{F}}_f &= -L\sigma, \\ \dot{y} &= (-\hat{F}_f + w + \sigma)/m, \\ \sigma &= M \tanh(e_y / \gamma_{e_y})\end{aligned}$$

Stabilization of A Gyroscopically Stabilized Robot on an Inclined Plane

Yangsheng Xu and Loi Wah Sun
The Chinese University of Hong Kong

- Develop a control system for a gyroscopically stabilized robot on an inclined plane
- Develop a complete dynamic model
- Study its stabilization on inclined plane
- Propose the backstepping control for trajectory tracking and stabilization



Fuzzy Logic Based Optimization for Manipulators

M. C. Ramos and A. J. Koivo
Purdue University