

Department of Mechanical Engineering
Cleveland State University

MCE/EEC 647/747: Robot Dynamics and Control
Optional Homework - Spring 2015

Due May 8th (email only)

Solve only one of the following:

1. *High-order observer for PUMA robot*: Assuming you were successful in tuning the robust and adaptive controllers of HW6, add a Nicosia-Tomei [1] high-order observer to allow operation with position sensing only.
2. *Sliding Mode observer for two-link robot case study*: For zero external force, develop and deploy a sliding observer [2] based on the simplified second-order independent joint model. You must calculate a nominal value for f and a bound on Δf .

References

- [1] Nicosia, S. and Tomei, P., "Robot control by using only joint position measurements", IEEE Transactions on Automatic Control, v.35, n.9, pp. 1058-1061, 1990.
- [2] Slotine, J.J. and Hedrick, J.K. and Misawa, E.A., "On sliding observers for nonlinear systems", ASME Journal of Dynamic Systems, Measurements and Control, v.109, n.3, pp. 242-252, 1987.