PennState College of Engineering

Systems, Controls, and Robotics Seminar Series

Input Shaping for Vibratory Systems using Deadbeat Control Theory

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ABSTRACT

Algorithms are developed for input shaping of a vibratory system on the basis of the deadbeat state feedback control theory in discrete-time. These algorithms are easily extended to generate input sequence robust to parametric uncertainties in a flexible structure. Numerical results are presented for both single and multi-input systems with one and many vibratory modes, including those corroborating the robustness of shaped inputs obtained using nominal parameters.

BIOGRAPHY

Alok Sinha is a Professor of Mechanical Engineering at Penn State. He received his B. Tech. and Ph.D degrees in Mechanical Engineering from IIT Delhi and Carnegie Mellon University, Pittsburgh, respectively. His areas of teaching and research are Vibration, Control Systems, Jet Engines, Robotics, Neural Networks and Nanotechnology. He has authored a graduate textbook “Linear Systems: Optimal and Robust Control”, a textbook “Vibration of Mechanical Systems” and a research monograph , “Vibrations of Nearly Periodic Structures and Mistuned Bladed Rotors”. He has served as a Visiting faculty of Aeronautics and Astronautics at MIT, Cambridge and Stanford University; and as a researcher at Pratt & Whitney, E. Hartford, CT. He has also been associate editors of ASME Journal of Dynamic Systems, Measurement and Control, ASME Journal of Turbomachinery and AIAA Journal. Dr. Sinha is a Fellow of ASME, a Fellow of American Association for the Advancement of Science (AAAS) , and an Associate Fellow of AIAA. He has received NASA certificate of recognition for significant contribution to Space Shuttle Microgravity Mission.