EE 546 Advanced Computer Control of Machines and Processes

Course Logistics:

Lectures: Students may attend in-class or online via Zoom Lecture Days: Thursdays from 6:00pm – 8:50 pm Instructor: Prof. Nagel (nnagel@uw.edu)

Course Objective:

The course objectives are to build confidence and competence in:

- understanding and practical insight in physics-based discrete time system modeling
- analysis and design in both the continuous and discrete domains
- analysis and design of control systems using tools such as Matlab and Simulink
- understanding physics-based control structures for computer control systems

Course Description:

This course will focus on the implementation of computer-controlled systems. We begin with a physics-based understanding of systems and how to properly model these in the discrete time domain. We will explore classical, fixed sampling impulse modeling using Laplace/Z-transform methods. We then explore classical and state feedback implementation of discrete time analysis and modeling, including command feedforward, disturbance input decoupling, and observers.

Course Grading:

- Homework 80%
- Final Exam 20%

Prerequisite: A course in classical continuous control or consent of instructor.

Computer software: access to PC or Mac with student or professional Matlab and MS Word and graphics software suitable for importing diagrams into MS Word documents (PC or Mac versions of Visio or Canvas are suggested).

Supplemental reference texts: Computer Control of Machines and Processes, J.G. Bollinger and N.A. Duffie, Addison-Wesley, 1988, or other comparable discrete time modeling textbook.