Term Project   ME2025 Digital Control

Due 2007/6/21

1. Find a system to control.

2. Clearly describe your control goals for the system

3. Give a continuous time transfer function of the linearized system

4. Give a state space realization of the continuous time linearized system

5. Select a sampling time T (explain how chosen)

6. Using a ZOH, provide a discrete time transfer function of the linearized system

7. Provide a state space realization of this discrete time transfer function

8. (Using Matlab), demonstrate the step response of the open loop linearized systems (in continuous and discrete time)

9. Design a digital PID controller (based upon a discrete time version of your system) to meet your controller goals, and show the control performance using Matlab

10. Check the controllability and observability of your system

11. Design a discrete time full state feedback controller using pole placement method, and do simulation using Matlab

12. Design a discrete time full state feedback controller using LQ optimal control law, and do simulation using Matlab

13. Design a discrete time full state observer

14. Combine this full state observer with the designed LQ optimal controller, and show the control performance using Matlab.

15. Design a discrete time minimum order state observer

16. Combine this minimum order state observer with the designed LQ optimal controller, and show the control performance using Matlab.