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| Class meetings | Topics | **In-class assignments:**  **T due Th, F due T** |
| Day 1  F Jan 19 | Intro. Input/Output systems. Review 1st order systems in time domain. Analytical and numerical solns. for free, forced-step, and forced-harmonic |  |
| Day 2  T Jan 23 | Review free response of 2nd order systems in the time domain. Analytical and numerical solutions. Connect parameters (e.g., damping ratio, natural/damped frequency) to system behavior. |  |
| Day 3  F Jan 26 | Review forced response of 2nd order systems in time domain to step and harmonic excitation. Analytical and numerical solutions. | HW 1  Due **F**, 1/26 |
| Day 4  T Jan 30 | Intro to the s-plane and the Laplace transform (LT). |  |
| Day 5  F Feb 2 | Applying the LT to solve ODEs, e.g., 2nd order ODE-output voltage of a circuit. Partial fraction expansions and the table lookup method. | HW 2  Due **F**, 2/2 |
| Day 6  T Feb 6 | Analytical Tools for 2nd order systems: Poles, zeros, transfer functions, stability, ideal oscillators (LC circuits). Symbolic MATLAB tools. |  |
| Day 7  F Feb 9 | Block diagrams. LT analysis and solution of overdamped, critically, and underdamped systems. Poles of 2nd order systems, their relationship to stability and response. | HW 3  Due **F**, 2/9 |
| Day 8  T Feb 13 | Intro to feedback control. Black’s formula, Final value theorem. Proportional and PI feedback. Steady-state error. |  |
| F Feb 16 | NO CLASSES due to Candidates Weekend 1 ! |  |
| Day 9  T Feb 20 | Analyzing feedback systems with MATLAB symbolic tools. PI control of a first order system. | HW 4  Due **W**, 2/21 |
| Day 10  F Feb 23 | Inverted pendulum (Rocky) eqns of motion. Formulating a feedback system for Rocky. Regulator problem |  |
| Day 11  T Feb 27 | Inverted pendulum (Rocky) project | HW 5  Due **W**, 2/28 |
| Day 12  F Mar 1 | Inverted pendulum (Rocky) project |  |
| Day 13  T Mar 5 | Inverted pendulum (Rocky) project | Quiz  Due **F**,3/8 |
| Day 14  F Mar 8 | Inverted pendulum (Rocky) project Demo Day | Final Project Deliverables  Due **F**,3/15 |