Kuwait University
College of Engineering and Petroleum

جامعة الكويت
KUWAIT UNIVERSITY

ME417 CONTROL OF MECHANICAL SYSTEMS

Part I: Introduction to Feedback Control

Lecture 11: Unity Feedback Controller Design

Summer 2020

Ali AlSaibie

Lecture Plan

- Objectives:
  - *Algebraically design a Unity Feedback Controller for a Second-Order System given Performance Specifications.*

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Design a proportional controller for the following system, in order to have a settling time $T_s < 1s$.

Is the closed-loop system with your designed controller: over/under/un or critically damped?

Does the closed-loop system behave like an ideal second order system?

$$G_p(s) = \frac{20(s+5)}{s(s+1)}$$

Example Continue

Design a PD controller for the following system such that it achieves a settling time $T_s = 0.5s$ and a damped frequency $\omega_d = 2rad/s$

Does the closed-loop system behave like a general second order system?

$$G_p(s) = \frac{5}{s^2 + 2s + 2}$$

Example Continue