Lab 3 Second Order Response Transient And Sinusoidal

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Lab 3 Second Order Response

Lab 3: SECOND-ORDER SYSTEM RESPONSE
Lab 3: SECOND-ORDER SYSTEM RESPONSE Section 1 -- Background Information In this lab we will construct a Simulink model of the closed-loop second-order torsion control plant The model performance will then be compared to that of the actual plant Since each ECP station has different characteristics, it is important that the same station used in

EE 230 Lab Second-order filter circuits
3 EE 230 Lab Lab 3 B RLC 2nd-order filters — high Q The three circuits shown in Fig 2 – 4 use the same components, but with different configurations to give the various types of filter response

Second Order Response Transient and Sinusoidal ReadMeFirst
Second Order Response Transient and Sinusoidal ReadMeFirst Lab Summary In this laboratory you are asked to characterize circuits that consist of all three passive elements These differ from the circuits that you investigated last week in that they are second order instead of first order Generally these circuits have one or two zeros and two

ME451 Laboratory Time Response Modeling and Experimental …
The objective of this experiment is to model a standard second-order system and to investigate the effect of system parameters and feedback on its response to a step input For this lab, we choose to experiment with a torsional mass-spring-damper system It will be shown that ideally this system acts as a second order, time-invariant system

Dynamic Response of Second Order Mechanical Systems with …

2-3 Second Order Mechanical Torsional System: Free Response of Second Order Mechanical System Pure Viscous Damping Forces Let the external force be null (F ext=0) and consider the system to have an initial displacement X o and initial velocity V o The equation of motion for a

Transient Response of a Second-Order System

Second-order system step response, for various values of damping factor ζ Three figures-of-merit for judging the step response are the rise time, the percent overshoot, and the settling time Percent overshoot is zero for the overdamped and critically damped cases For the underdamped case, percent overshoot is defined as

Second Order Systems

3Inherently Second Order Systems Critically Damped ζ= 1 Two distinct real roots ζ> 1 Overdamped 3 Response of 2nd Order System to Step Inputs Underdamped Fast, oscillations occur Eq 5-51 Faster than overdamped, no oscillation Critically damped Eq 5-50 Overdamped Sluggish, no oscillations Eq 5-48 or 5-49 Ways to describe underdamped

Natural and Step Response of Series & Parallel RLC ...

You can solve this problem using the Second-Order Circuits table: 1 Make sure you are on the Natural Response side 2 Find the parallel RLC column 3 Use the equations in Row 4 to calculate and 0 4 Compare the values of and 0 to determine the response form (given in one of the last 3 rows) 5

Time Response of Second Order Systems - Mercer University

response to the desired response The settling time is the time required for the system to settle within a certain percentage of the input amplitude For second order system, we seek for which the response remains within 2% of the final value This occurs approximately when:

Underdamped Unstable

Second order step response – Time specifications 0 05 1 15 2 25 3 0 02 04 06 08 1 12 14 … Steady state value … Time to reach first peak (undamped or underdamped only) … % of in excess of … Time to reach and stay within 2% of … Time to rise from 10% to 90% of

Lab 5 – Second Order Transient Response of Circuits

Lab 5 – Second Order Transient Response of Circuits Lab Performed on November 5, 2008 by Nicole Kato, Ryan Carmichael, and Ti Wu Report by Ryan Carmichael and Nicole Kato E11 Laboratory Report – Submitted November 24, 2008 Department of Engineering, Swarthmore College

ECE201 Laboratory – 3

This is a somewhat more direct expression for what you will observe in the lab A typical underdamped step response is shown in Figure 48 Figure 48 Second order system step response 9 The overshoot of the response is indicated by the horizontal line In this case the overshoot is

Massachusetts Institute of Technology I

Massachusetts Institute of Technology Department of Mechanical Engineering 2003 Modeling Dynamics and Control I Spring 2005 Lab 3, week 3/07/05 In this lab, we explore the transient response of a second-order system as its stiffness and damping are varied As always, be sure to show your work and attach a plot of each response that you obtain

Review of First- and Second-Order System Response 1 First ...

Review of First- and Second-Order System Response1 1 First-Order Linear System Transient Response The dynamics of many systems of interest to engineers may be represented by a simple model Figure 3: Normalized unforced response of a stable flrst-order system

Lab 2: FIRST-ORDER SYSTEM RESPONSE

EC2300 Control Systems Lab 2 – First-Order System Response 3 Lab 2r6doc, 29 March 2006 h Plot Data: Select Plotting à Setup Plot 1 For the left axis chose Encoder 1 Velocity, and for the right axis choose Encoder 1 Position Select Plot Data 2

Free Response of Second Order Mechanical System

1-3 Second Order Mechanical Torsional System: Fundamental equation of motion Free Response of Second Order SDOF Mechanical System Let the external force F ext = 0 and the system has an initial displacement X o and initial velocity V o EOM is 2 2 0 d X d X M D K X d t d t (1)

Signal Generator IN C L IN (t) R (t) OUT Massachusetts …

Lab 3: Second-Order Networks Handout S07-49 Spring 2007 Introduction The purpose of this lab is to give you experience with second-order networks, and to illustrate that real network elements do not always behave in an ideal manner All exercises in this lab focus on the behavior of the network and network elements shown in Figure 1

Laboratory handout 4 – Second-order systems

laboratory handouts, me 340 65 t Figure 2: The unit impulse response of an underdamped second-order system For z > 1, the system is overdamped and h(t) = eg1t ge 2t g1 g2 = e zwnt wn p z2 1 sinh wn q z2 1t (10) In this case, the unit impulse response is a sum of exponentially decaying terms, and does not oscillate about 0 t Figure 3: The

second order intro - Iowa State University

EE 230 second-order filters – 2 Second-order filters Our approach is the same as the first-order circuits • Examine the transfer functions for low-pass, high-pass, and (now) band-pass • Look at the details of the frequency response of each type of filter — cut-off …