ENG4550: Introduction to Control Systems

Assignment 4: Basic Properties of Feedback

Name: _____

Student No.: _____

Lab #: _____

Date: _____

Note: Please FINISH YOUR OWN assignment. Discussion with others is acceptable, but line-by-line copying of someone else's homework is cheating, and both of you will result in a mark of zero for that assignment.

Due Date: October 24, 2019

Total Marks: 20

Problem 4.14

Consider the second-order system

$$G(s) = \frac{1}{s^2 + 2\zeta s + 1}$$

We would like to add a transfer function of the form $D_c(s) = \dfrac{K(s+a)}{s+b}$ in series with $G(s)$ in a unity feedback structure.

(a) Ignoring stability for the moment, what are the constraints on K, a, and b so that the system is Type 1?

(b) What are the constraints placed on K, a, and b so that the system is both stable and Type 1?

(c) What are the constraints on a and b so that the system is both Type 1 and remains stable for every positive value for K?