sUmm Al-Qura Universtiy, Makkah

Department of Electrical Engieerig

Controls (802331)

Term 2; 2016/2017

Solution Home Work 6

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You do not have to submit this home work. This homework will be part of midterm (March 29 & 30).

**Q1.** Second order system is described as

Find the “step response” and “impulse response” for the following cases

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**Solution:**

We did the step response in the class. Here we will do the impulse response only.

**Q2.** For each of the following second order transfer functions shown below, compute and sketch the step response [Hint: First find the damping ratio .].

Also make pole-zero diagram for each transfer function.

**Solution:**

For all of these transfer functions, and .

1. . Hence . The output will be:
2. . Hence . The output will be:

1. . Hence . The output will be:

1. . Hence . The output will be:
2. . Hence . The output will be:

1. . Hence . The output will be:





**Q3.** Find the transfer function for the block diagram shown in Figure 5-5(b) [page 175]. Identify the un-damped natural frequency and the damping co-efficient.

**Solution:**

Hence

**Q4.** Find the transfer function for the block diagram shown in Figure 5-13(a) [page 186]. Identify the un-damped natural frequency and the damping co-efficient.

**Solution:**

Transfer function for the inner loop:

Transfer function for the outer loop:

Hence