



**Course: Computer-Controlled Systems (CSE422)**

**Sheet No.: 2**

**Date: 22/2/2018**

**Due: 22/2/2018**

**Time: 2 Hours**

**Discussion Points:**

1. Review continuous control concepts.

**Problems:**

2. For the given differential equation:

$$\ddot{y} + 10\dot{y} + 100y = 100u$$

Determine the following:

- 2.1. The system transfer function.
- 2.2. System eigenvalues.
- 2.3. Characteristic equation.
- 2.4. System stability.
- 2.5. Natural frequency.
- 2.6. Damping ratio.
- 2.7. Overshoot.
- 2.8. Peak time.
- 2.9. Settling time.
- 2.10. Step response.

3. For the following block diagram:

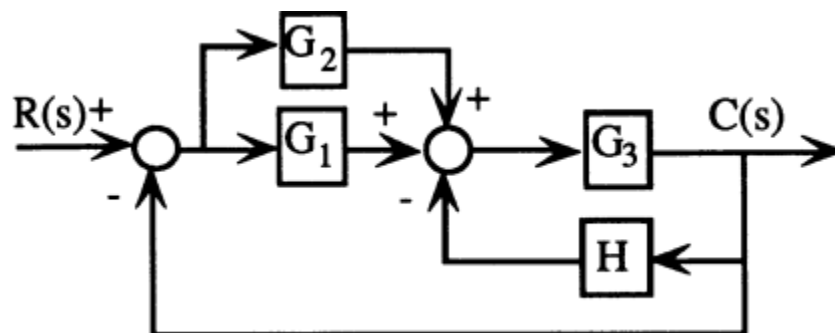


Figure 1

Obtain the system transfer function given that  $G_1 = \frac{10}{s}$ ,  $G_2 = 1 + 2s$ ,  $G_3 = 100$  and  $H = \frac{1}{s+1}$