



Biomedical Engineering

Subject: أنظمة التحكم الآلي  
Course Code: ECE 252  
Level: 200  
Allowed Hours: 1 Hour  
2 / 4 / 2018  
Midterm 2017/2018  
Total Marks: 20

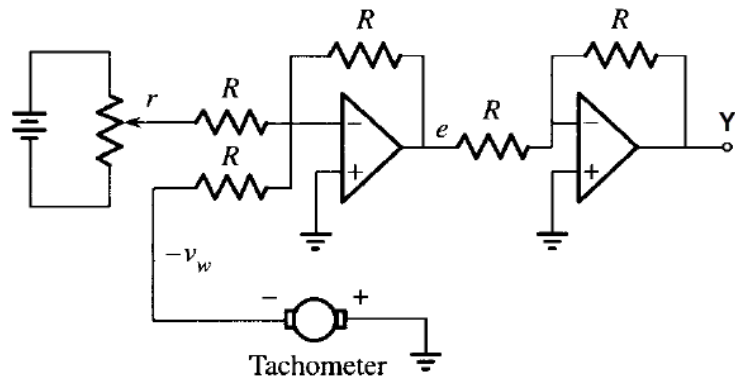


Faculty of Engineering

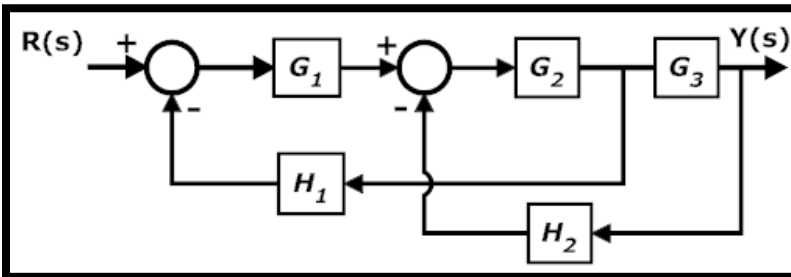
### Question No. 1

[10 Marks]

- A. Obtain the equation that relates the output voltage  $Y(s)$  to  $r(s)$  and  $v_w(s)$



- B. Use Block diagram reduction to find transfer function  $\frac{Y(s)}{R(s)}$



### Question No. 2

[10 Marks]

- A. For the system that have the **transfer function**, find

$$\frac{C(s)}{R(s)} = \frac{10}{s^2 + 4s + 4}$$

- Find the **unit-step response analytically**
- Obtain the unit-step response **Using MATLAB**

- B. For the **separate excited DC motor**,

- Obtain the mathematical model equation that govern the motor
- sketch the block diagram for the system
- find the transfer function that relates the field voltage  $V_f(s)$  source to the motor speed  $\omega(s)$  — make block reduction

\*\*\*\* BEST WISHES \*\*\*\*

Dr. Mostafa A. Elhosseini