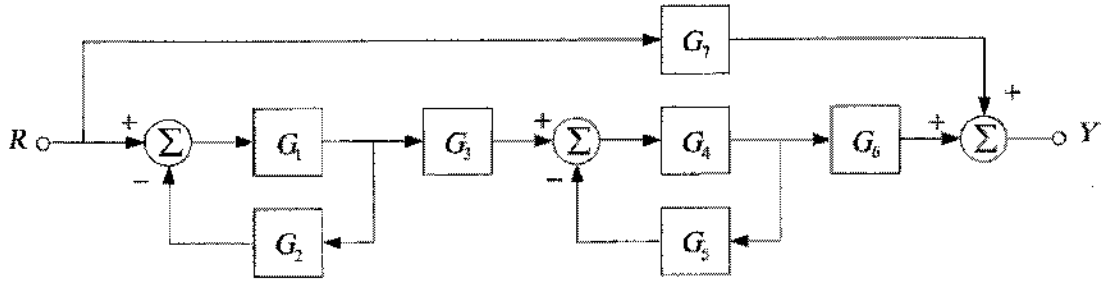
KAFR-ELSHIEKH UNIVERSITY
FACULTY OF ENGINEERING
DATE: 30 DECEMBER 2019
TIME ALLOWED: 3 HOURS

ELECTRICAL ENGINEERING DEPARTMENT
COMPUTER ENGINEERING AND SYSTEMS BRANCH
2ND YEAR FINAL EXAM OF 1ST SEMESTER 2019 - 2020
AUTOMATIC CONTROL [1] [CODE NO. ECS 2205]

QUESTION NUMBER ONE [35 MARKS]

1. State advantages and disadvantages of the block diagram technique. Then, reduce the following block diagram and obtain its transfer function. [10 Marks]



2. Find the transfer function for the mechanical system given by Fig. (1). [10 Marks]

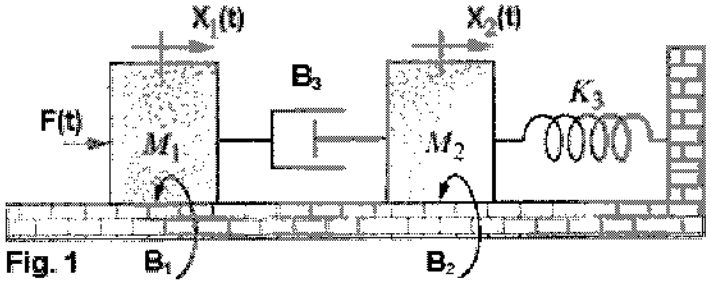


Fig. 1

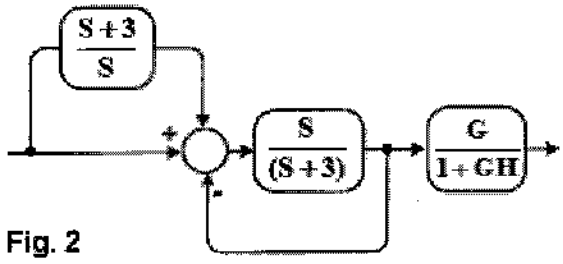


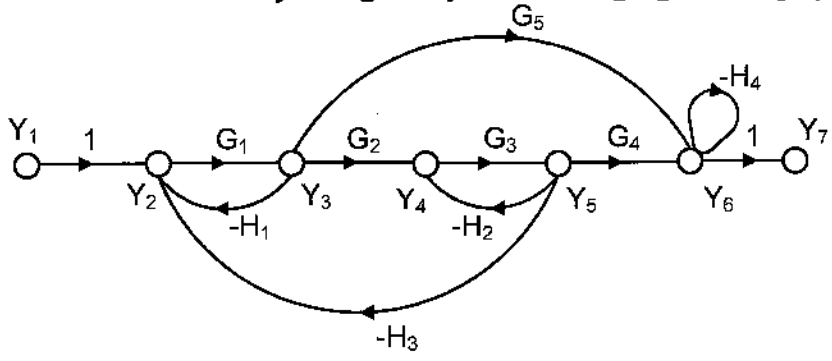
Fig. 2

3. Find K_1 and K_2 for the system given by Fig. (2), such that $M_p=0.2$, $t_p=1$, after that deduce the output time response for the given system. [15 Marks]

$$G(S)=\frac{K_1}{S(S+1)} \qquad H(S)=1+K_2S$$

QUESTION NUMBER TWO [35 MARKS]

1. Find the transfer function for the system given by the following signal flow graph. [10 Marks]



2. Draw the approximate root locus diagram for a close loop system whose open loop transfer function is given by; [15 Marks]

$$G(S)H(S)=\frac{K(S+5)}{S(S+4)(S^2+2S+3)}$$

3. State the advantages and limitations of Hurwitz stability criterion. Then, examine the stability for the system with the following characteristic equation; [10 Marks]

$$S^6+3S^5+4S^4+6S^3+5S^2+3S+2=0$$

Best wishes [Assoc. Prof. Hamdy K. Al-Moniar]