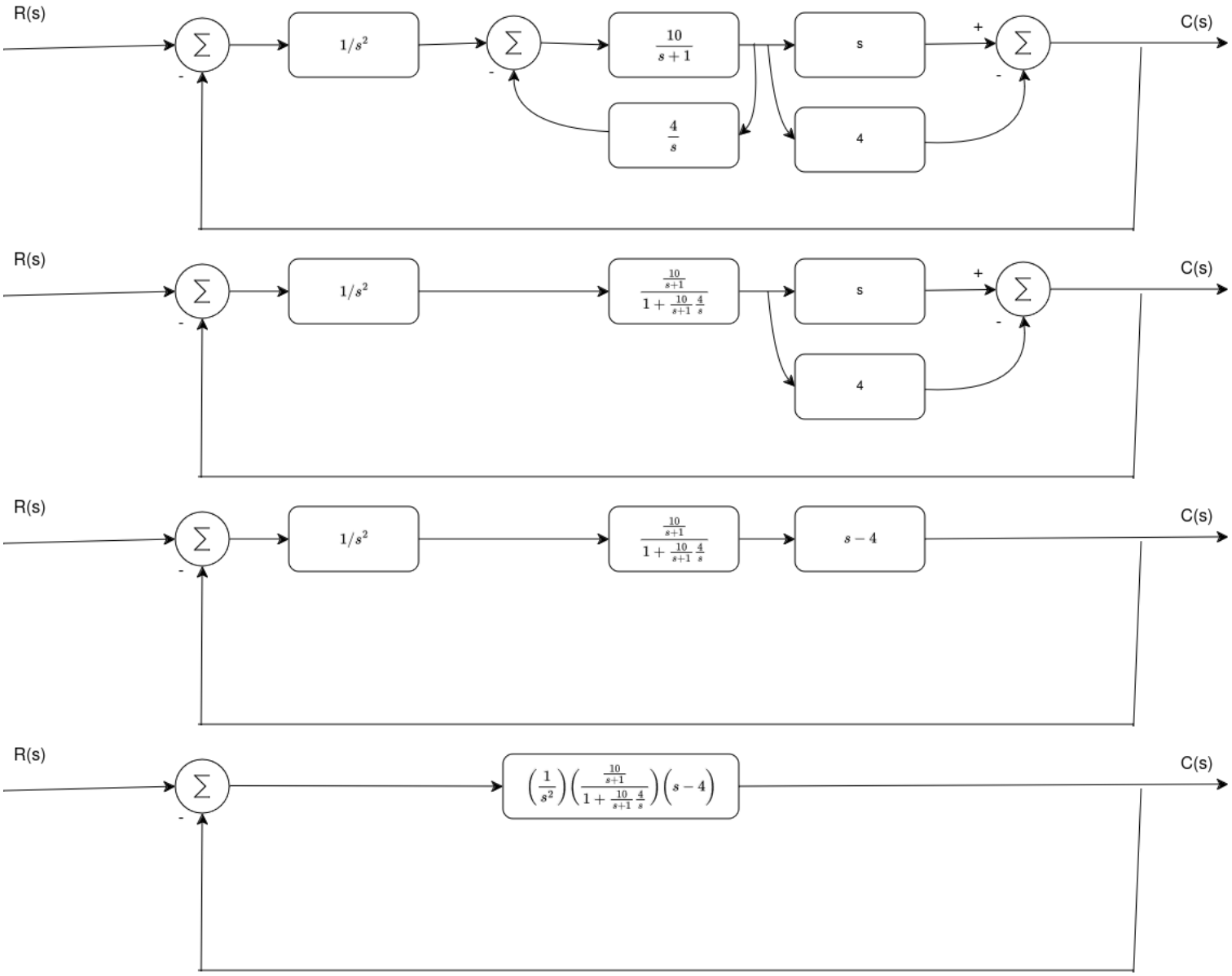
Assignment 3

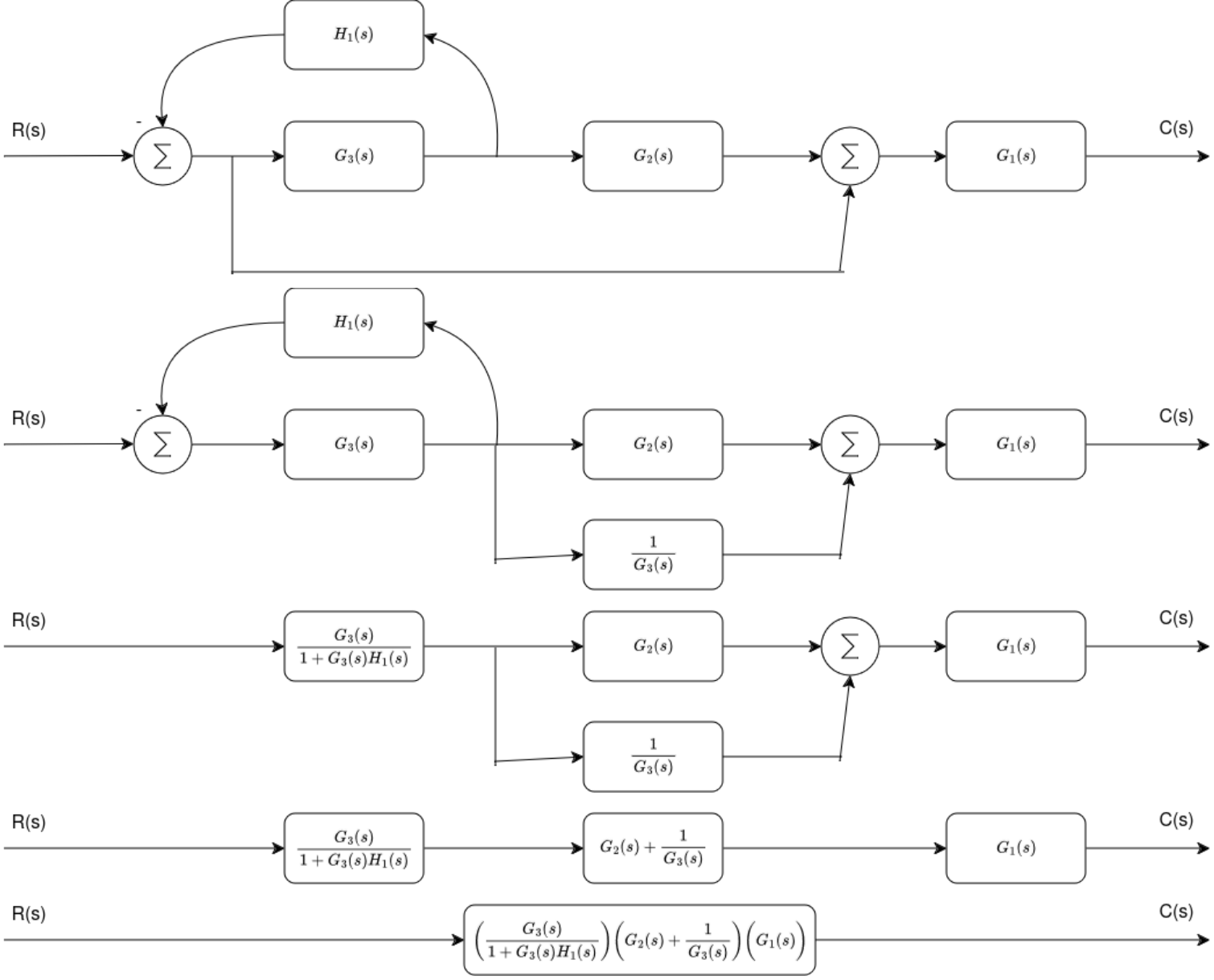
Bradley D. Schmidt (T00711584)

Question 1:



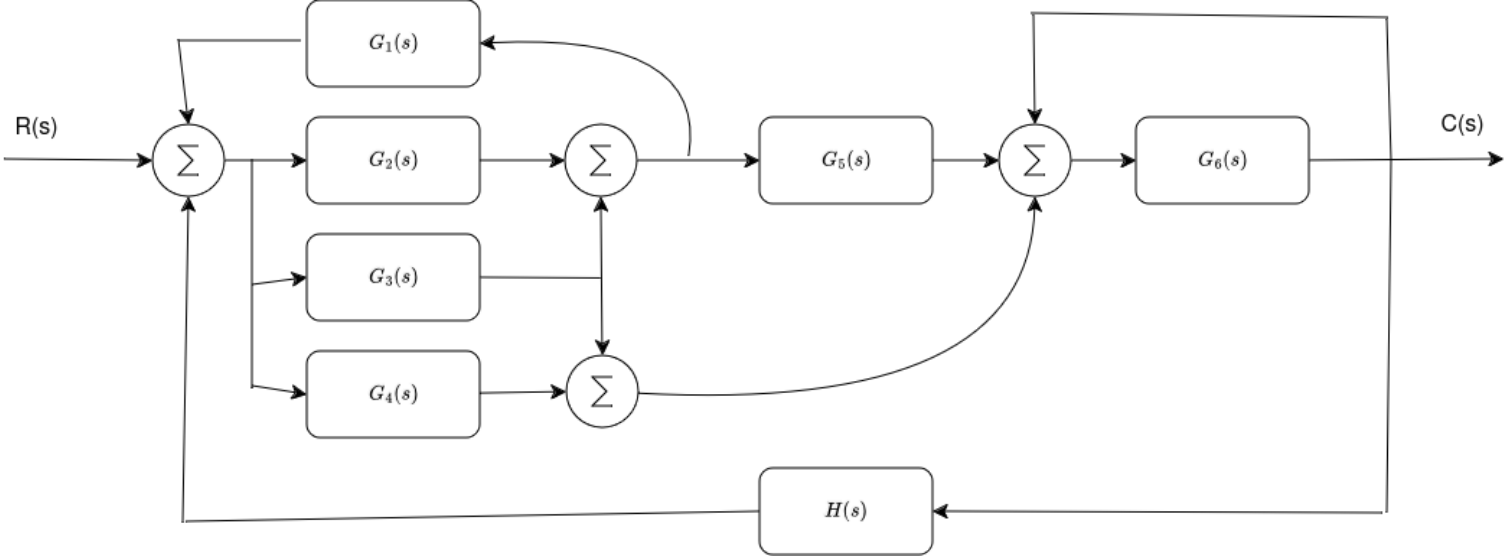
$$\frac{C(s)}{R(s)} = G(s) = \frac{\left(\frac{1}{s^2}\right)\left(\frac{\frac{10}{s+1}}{1+\frac{10}{s+1}\frac{4}{s}}\right)\left(s-4\right)}{1+\left(\frac{1}{s^2}\right)\left(\frac{\frac{10}{s+1}}{1+\frac{10}{s+1}\frac{4}{s}}\right)\left(s-4\right)}$$

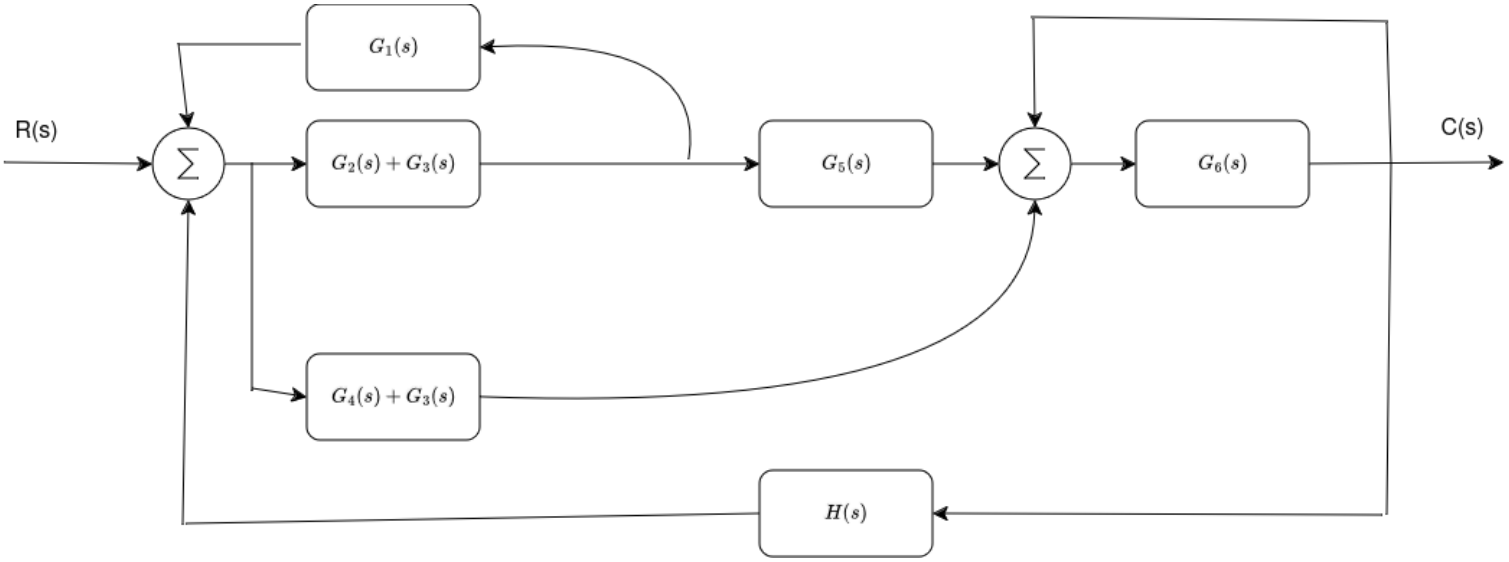
Question 2:

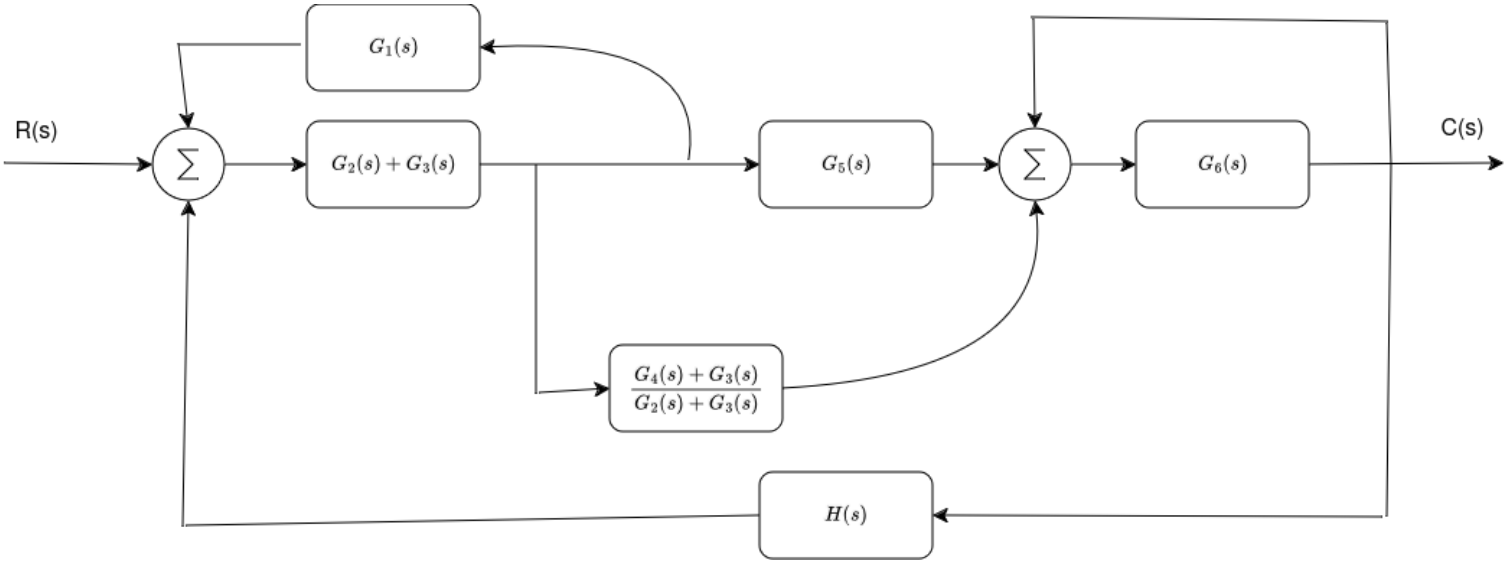


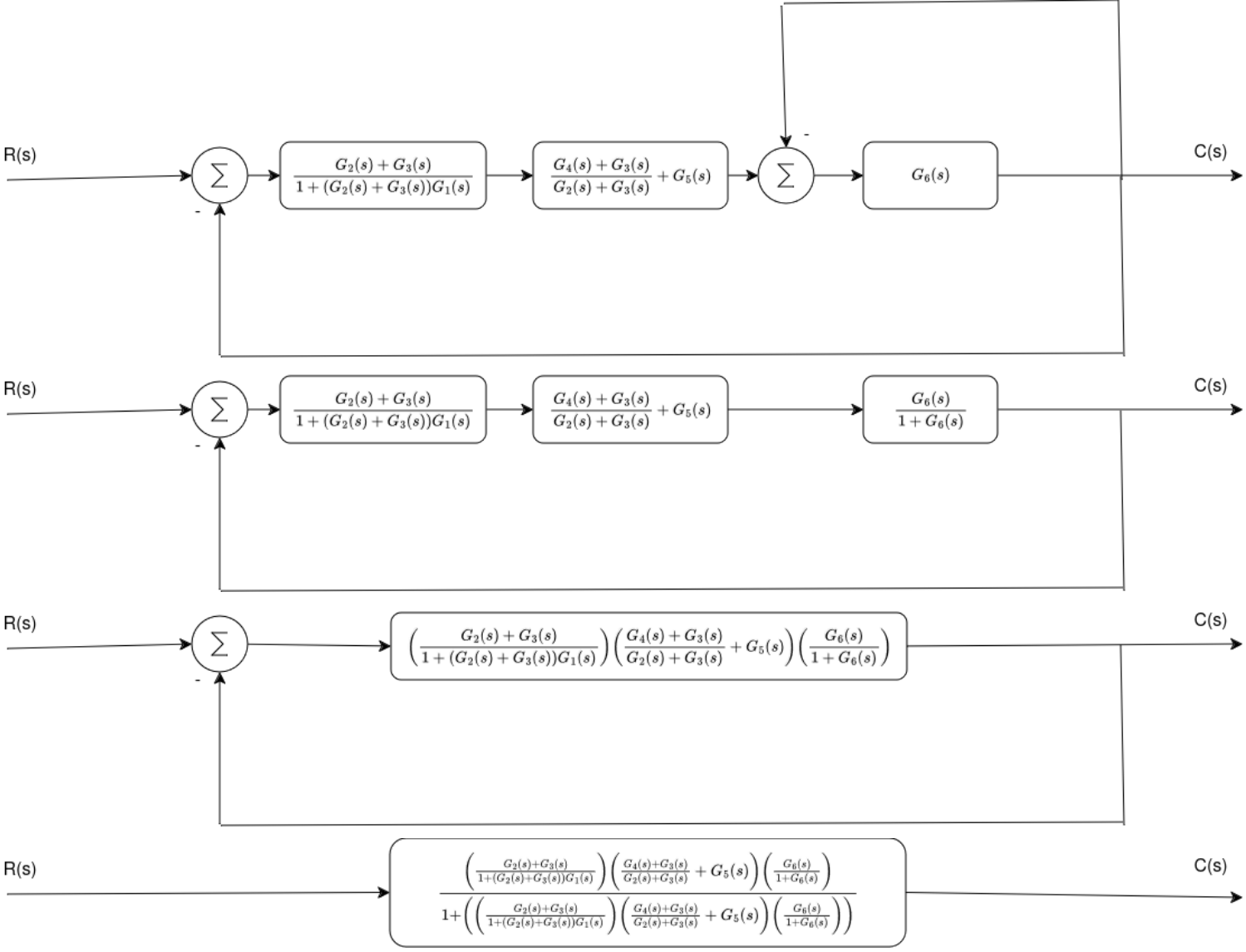
$$\boxed{\frac{C(s)}{R(s)} = G(S) = \left(\frac{G_3(s)}{1+G_3(s)H_1(s)}\right)\left(G_2(s)+\frac{1}{G_3(s)}\right)\left(G_1(s)\right)}$$

Question 3:


R(s)
$G_1(s)$
$G_2(s)$
$G_3(s)$
$G_4(s)$
$G_5(s)$
$G_6(s)$
C(s)
$H(s)$

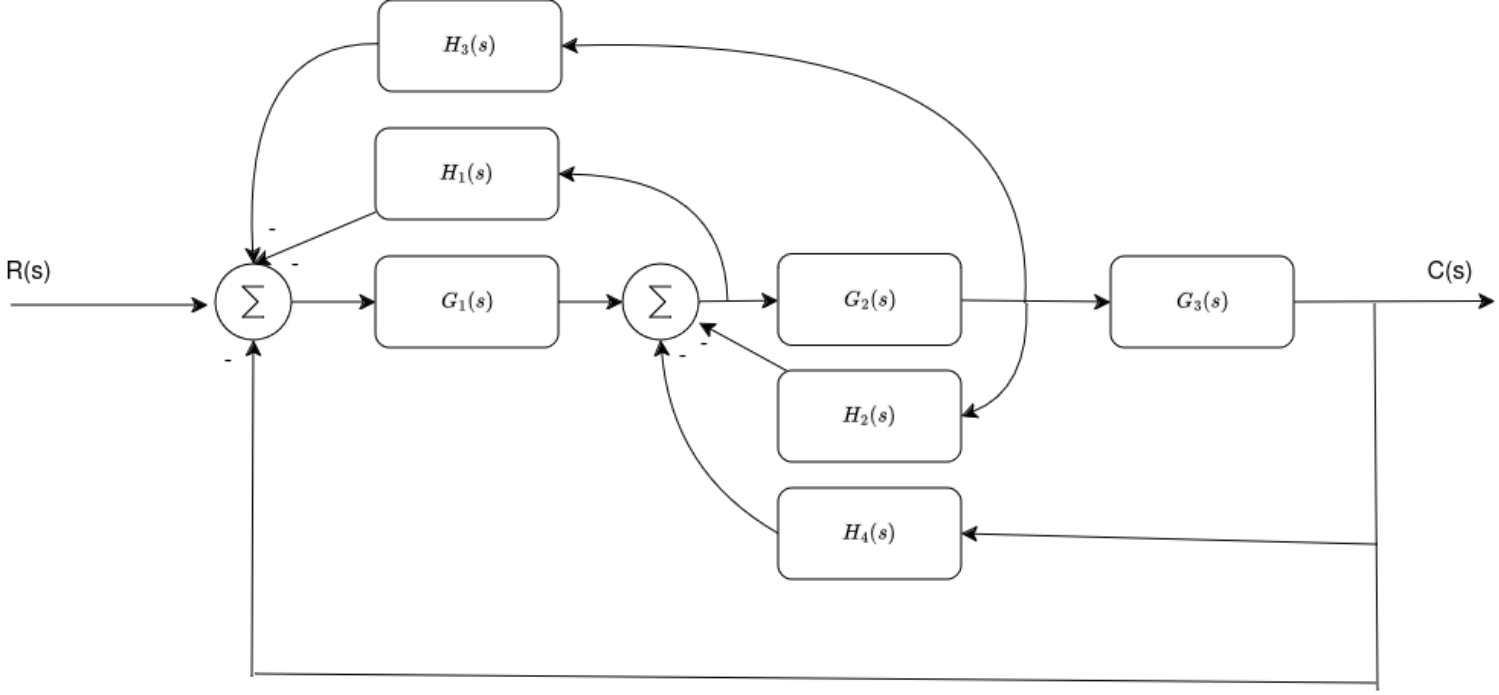

R(s)
$G_1(s)$
$G_2(s) + G_3(s)$
$G_4(s) + G_3(s)$
$G_5(s)$
$G_6(s)$
C(s)
$H(s)$

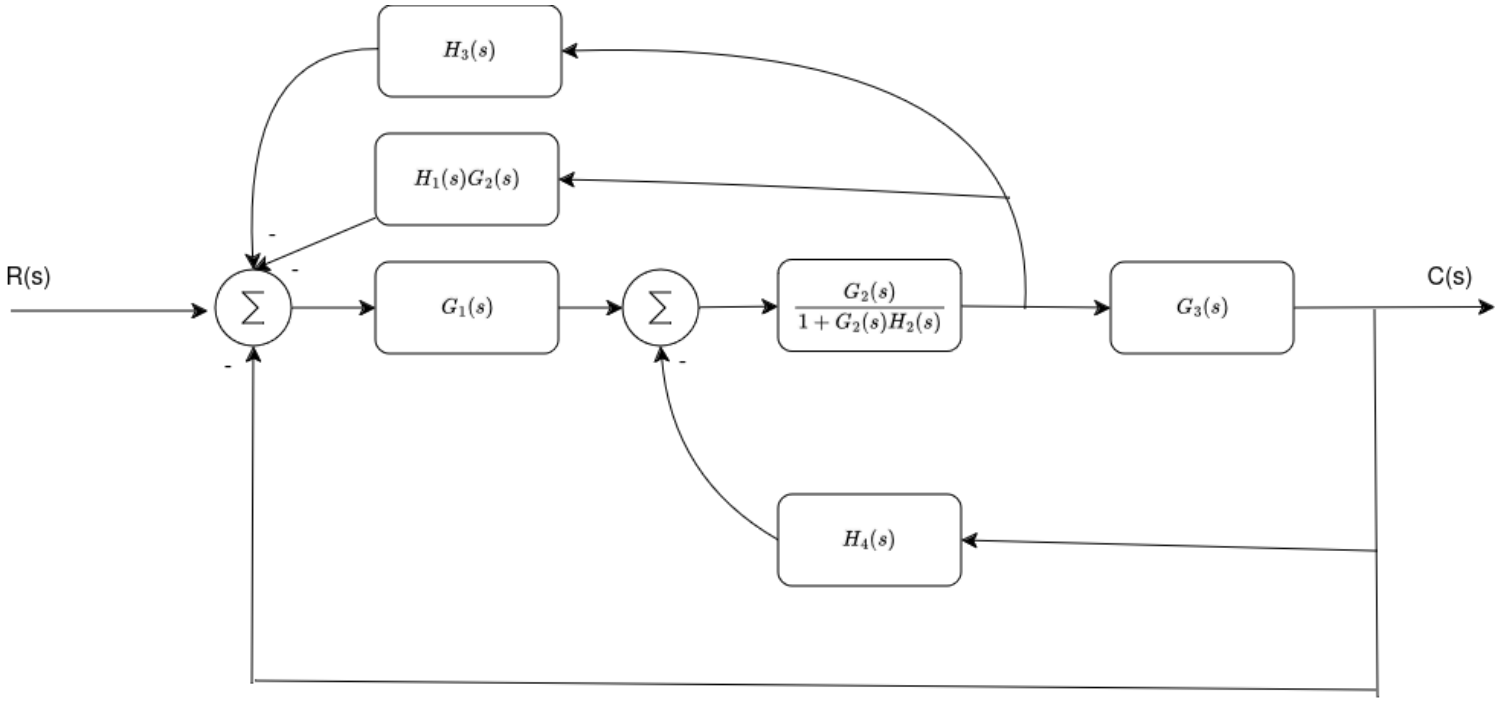

R(s)
$G_1(s)$
$G_2(s) + G_3(s)$
$\frac{G_4(s) + G_3(s)}{G_2(s) + G_3(s)}$
$G_5(s)$
$G_6(s)$
C(s)
$H(s)$

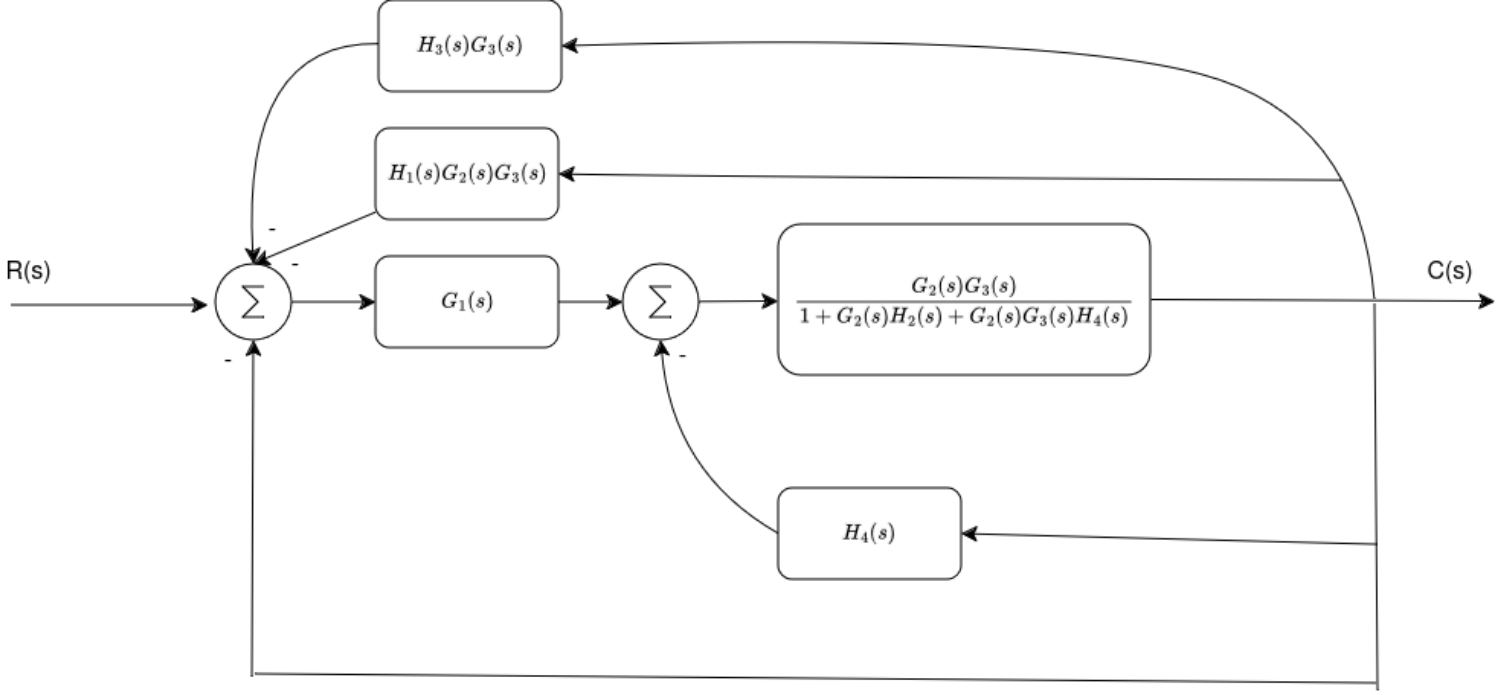


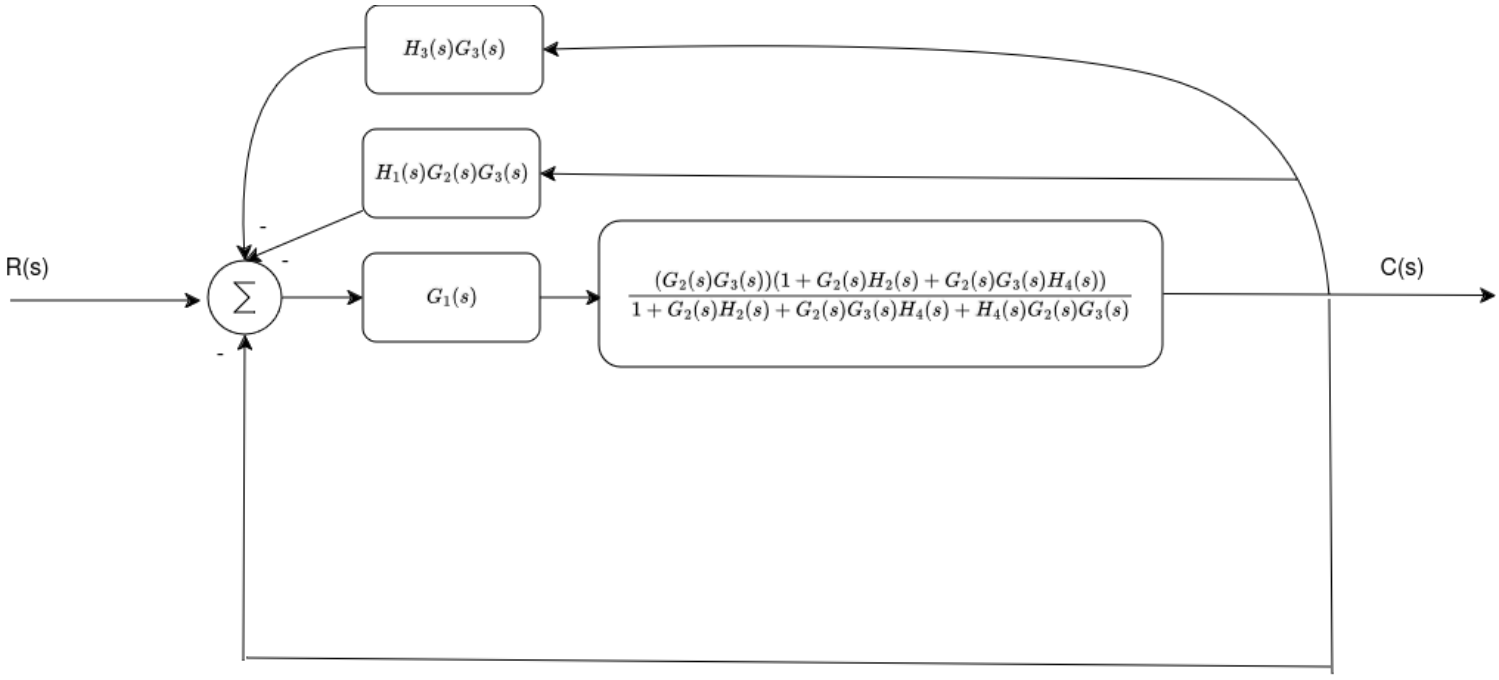
$$\frac{C(s)}{R(s)} = G(s) = \boxed{\frac{\left(\frac{G_2(s)+G_3(s)}{1+(G_2(s)+G_3(s))G_1(s)}\right)\left(\frac{G_4(s)+G_3(s)}{G_2(s)+G_3(s)}+G_5(s)\right)\left(\frac{G_6(s)}{1+G_6(s)}\right)}{1+\left(\left(\frac{G_2(s)+G_3(s)}{1+(G_2(s)+G_3(s))G_1(s)}\right)\left(\frac{G_4(s)+G_3(s)}{G_2(s)+G_3(s)}+G_5(s)\right)\left(\frac{G_6(s)}{1+G_6(s)}\right)\right)}}$$

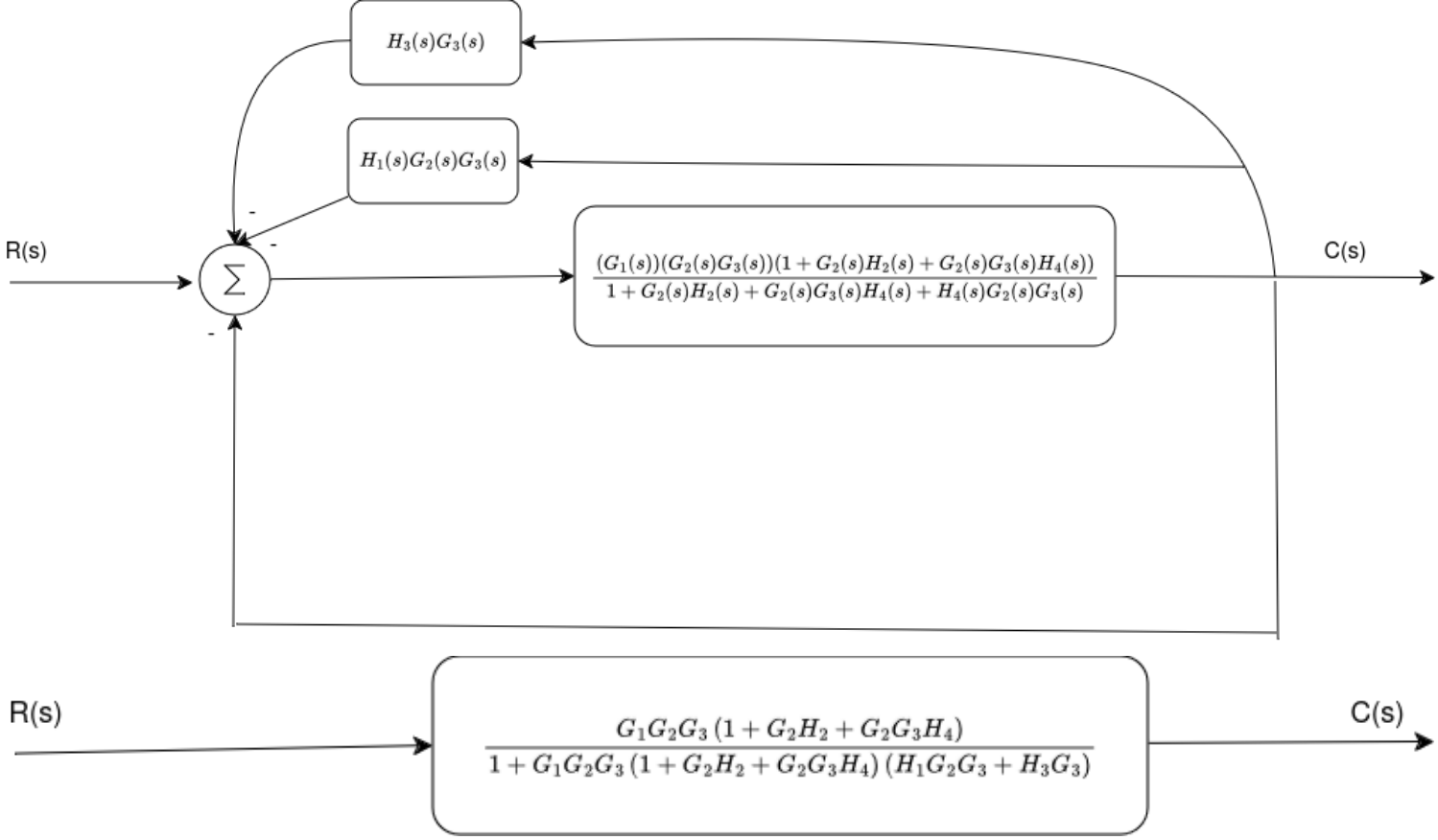
Question 4:


$H_3(s)$
$H_1(s)$
R(s)
$G_1(s)$
$G_2(s)$
$G_3(s)$
C(s)
$H_2(s)$
$H_4(s)$


$H_3(s)$
$H_1(s)G_2(s)$
R(s)
$G_1(s)$
$\frac{G_2(s)}{1+G_2(s)H_2(s)}$
$G_3(s)$
C(s)
$H_4(s)$

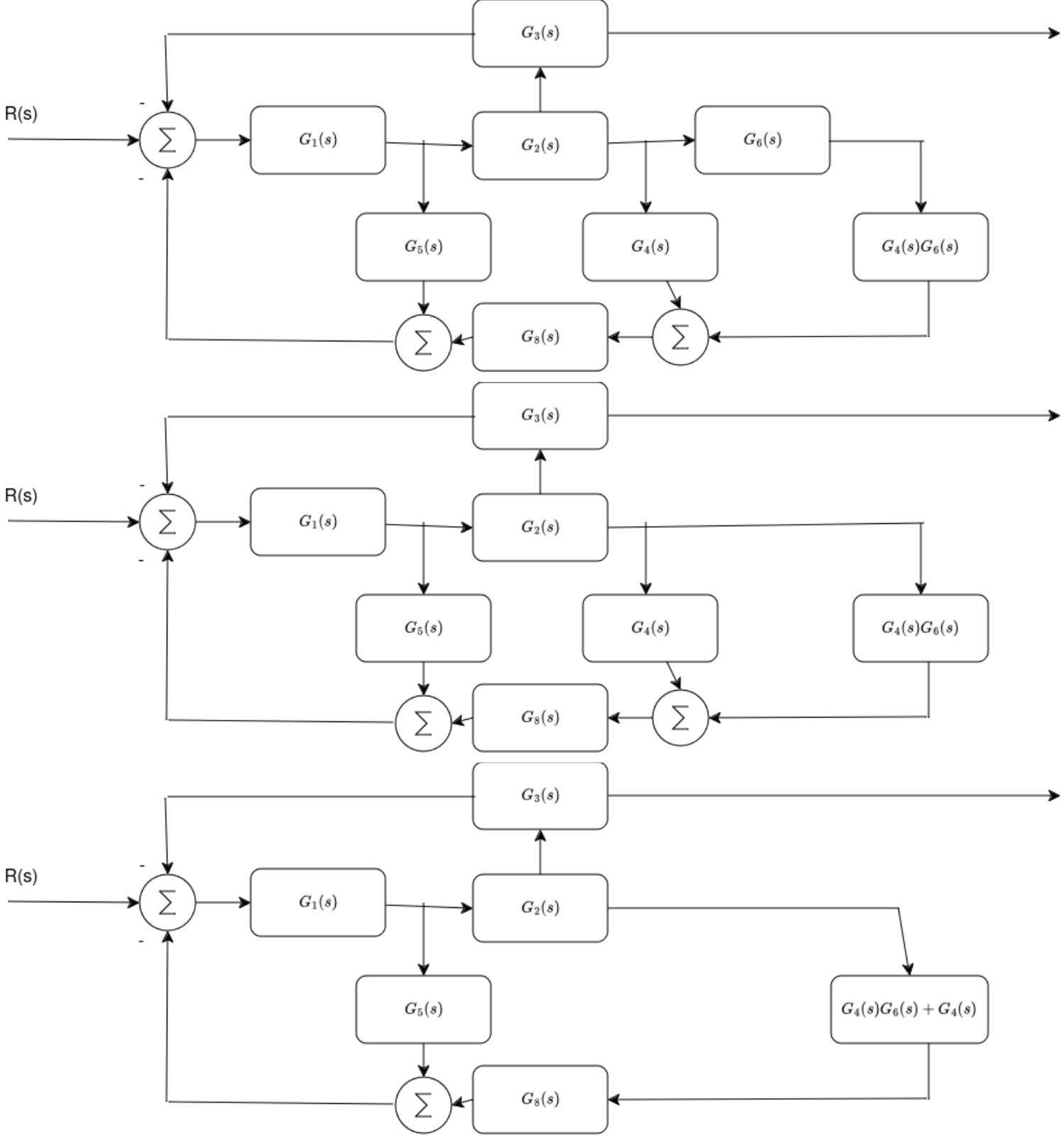

$H_3(s)G_3(s)$
$H_1(s)G_2(s)G_3(s)$
R(s)
$G_1(s)$
$\frac{G_2(s)G_3(s)}{1+G_2(s)H_2(s)+G_2(s)G_3(s)H_4(s)}$
C(s)
$H_4(s)$

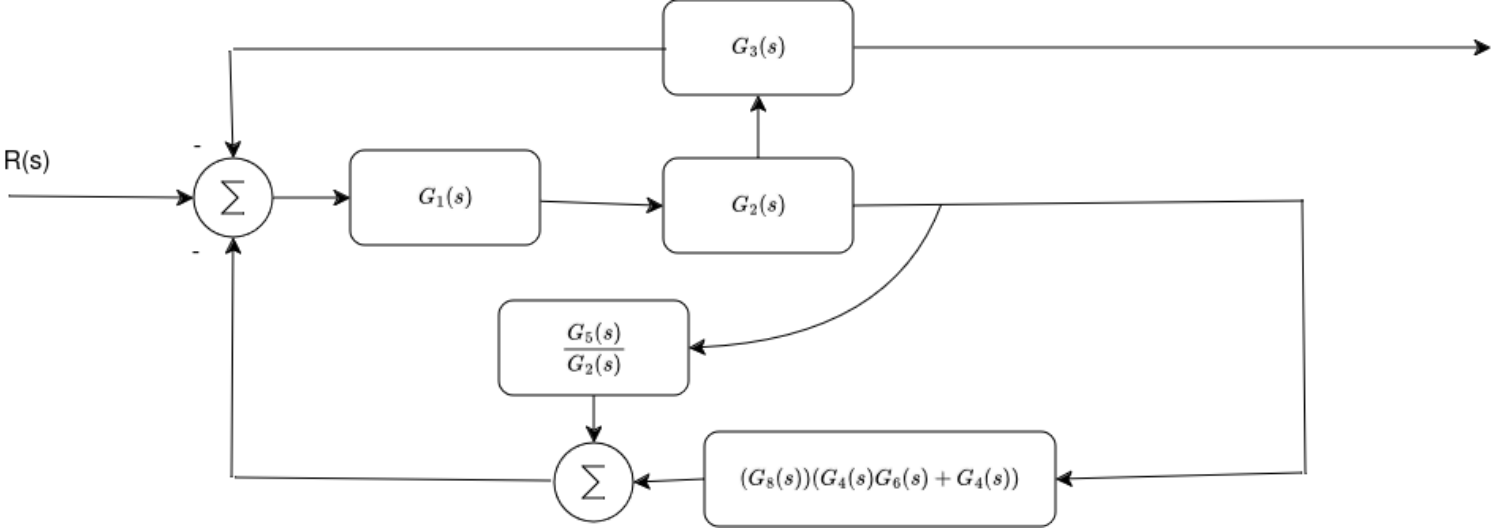

$H_3(s)G_3(s)$
$H_1(s)G_2(s)G_3(s)$
R(s)
$G_1(s)$
$\frac{(G_2(s)G_3(s))(1+G_2(s)H_2(s)+G_2(s)G_3(s)H_4(s))}{1+G_2(s)H_2(s)+G_2(s)G_3(s)H_4(s)+H_4(s)G_2(s)G_3(s)}$
C(s)

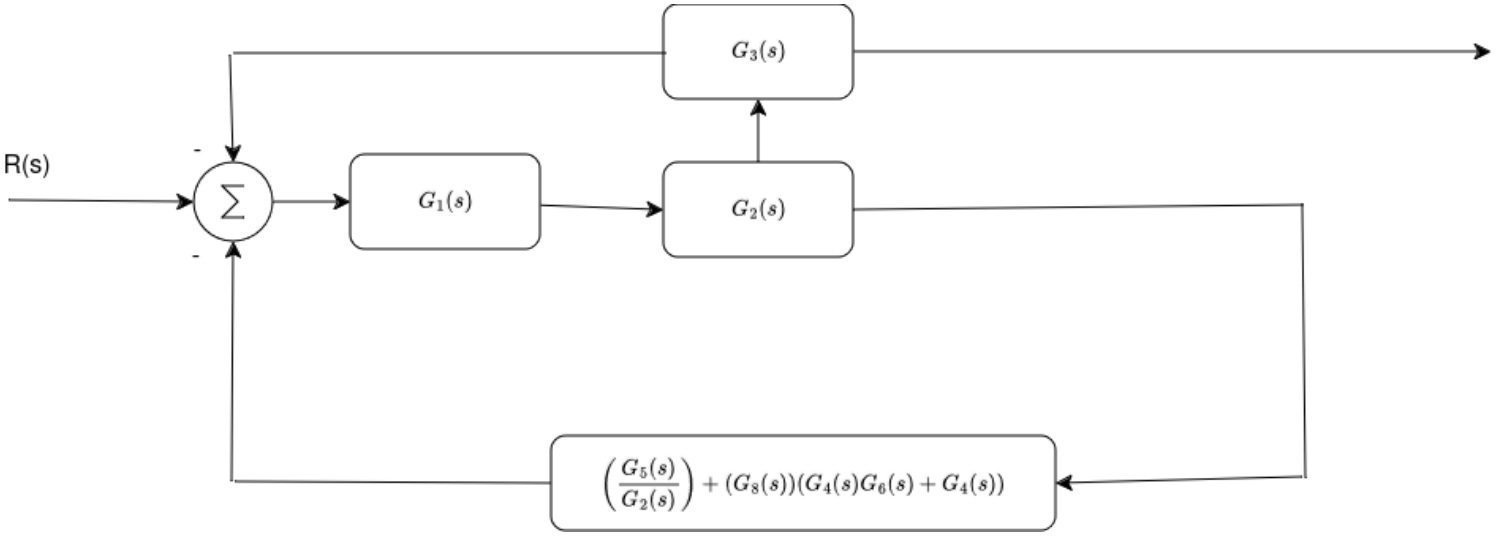

$H_3(s)G_3(s)$
$H_1(s)G_2(s)G_3(s)$
R(s)
-
-
-
$\frac{(G_1(s))(G_2(s)G_3(s))(1+G_2(s)H_2(s)+G_2(s)G_3(s)H_4(s))}{1+G_2(s)H_2(s)+G_2(s)G_3(s)H_4(s)+H_4(s)G_2(s)G_3(s)}$
C(s)

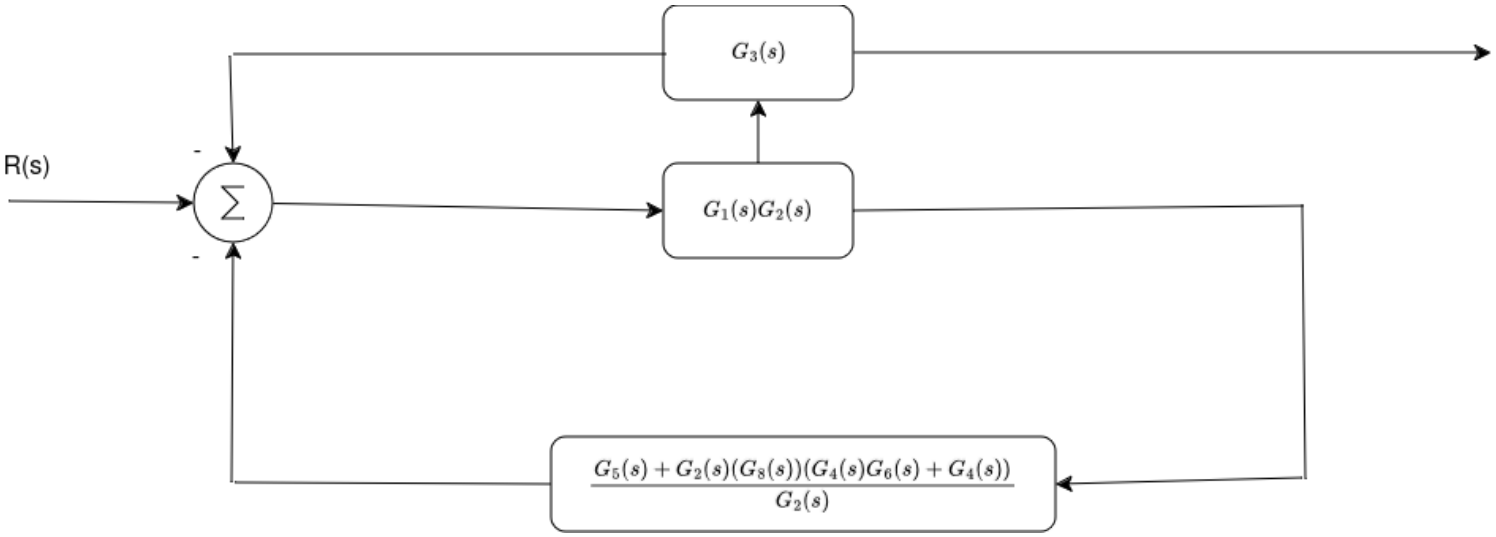
R(s)
$\frac{G_1G_2G_3\left(1+G_2H_2+G_2G_3H_4\right)}{1+G_1G_2G_3\left(1+G_2H_2+G_2G_3H_4\right)\left(H_1G_2G_3+H_3G_3\right)}$
C(s)

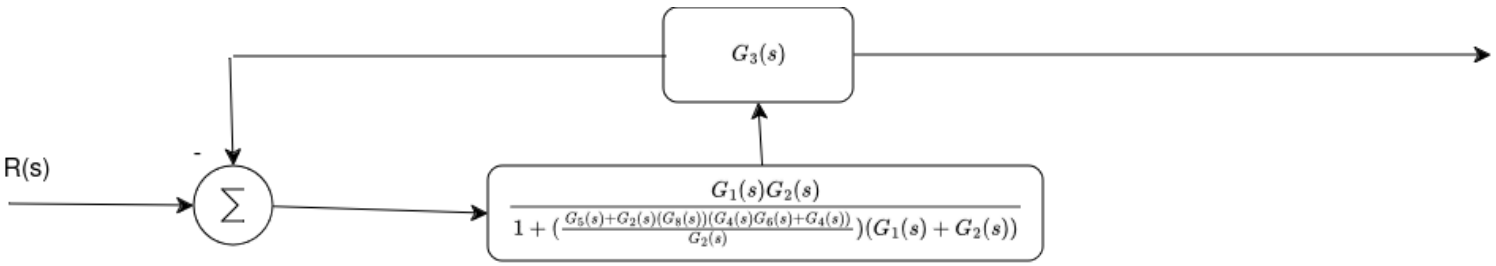
Question 5:

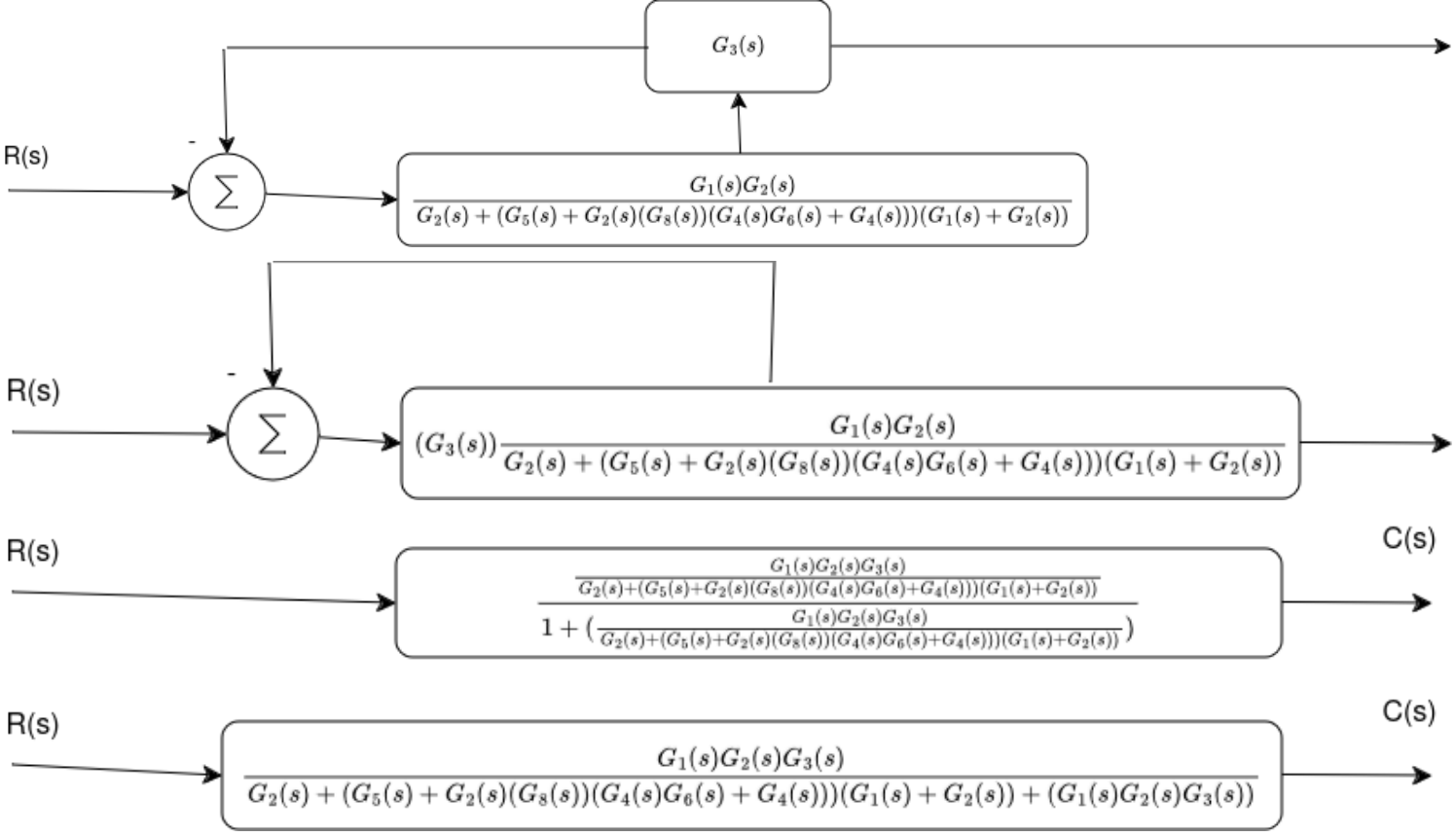

R(s)
-
-
$G_1(s)$
$G_2(s)$
$G_3(s)$
$G_4(s)$
$G_4(s)G_6(s)$
$G_5(s)$
$G_6(s)$
$G_8(s)$
R(s)
-
-
$G_1(s)$
$G_2(s)$
$G_3(s)$
$G_4(s)$
$G_4(s)G_6(s)$
$G_5(s)$
$G_8(s)$
R(s)
-
-
$G_1(s)$
$G_2(s)$
$G_3(s)$
$G_4(s)G_6(s) + G_4(s)$
$G_5(s)$
$G_8(s)$


R(s)
-
-
$G_1(s)$
$G_2(s)$
$G_3(s)$
$\frac{G_5(s)}{G_2(s)}$
$(G_8(s))(G_4(s)G_6(s)+G_4(s))$


R(s)
-
-
$G_1(s)$
$G_2(s)$
$G_3(s)$
$\left(\frac{G_5(s)}{G_2(s)}\right)+(G_8(s))(G_4(s)G_6(s)+G_4(s))$


R(s)
-
-
$G_1(s)G_2(s)$
$G_3(s)$
$\frac{G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s))}{G_2(s)}$


R(s)
-
-
$\frac{G_1(s)G_2(s)}{1+(\frac{G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s))}{G_2(s)})(G_1(s)+G_2(s))}$
$G_3(s)$


$G_3(s)$
R(s)
-
$\sum$
$\frac{G_1(s)G_2(s)}{G_2(s)+(G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s)))(G_1(s)+G_2(s))}$
R(s)
-
$\sum$
$(G_3(s))\frac{G_1(s)G_2(s)}{G_2(s)+(G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s)))(G_1(s)+G_2(s))}$
R(s)
C(s)
$\frac{\frac{G_1(s)G_2(s)G_3(s)}{G_2(s)+(G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s)))(G_1(s)+G_2(s))}}{1+(\frac{G_1(s)G_2(s)G_3(s)}{G_2(s)+(G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s)))(G_1(s)+G_2(s))})}$
R(s)
C(s)
$\frac{G_1(s)G_2(s)G_3(s)}{G_2(s)+(G_5(s)+G_2(s)(G_8(s))(G_4(s)G_6(s)+G_4(s)))(G_1(s)+G_2(s))+(G_1(s)G_2(s)G_3(s))}$