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(3/4)

Ex 1) $(I+GH)^{-1}G = G(I+L)^{-1}$

assumindo que a hipótese é verdadeira:

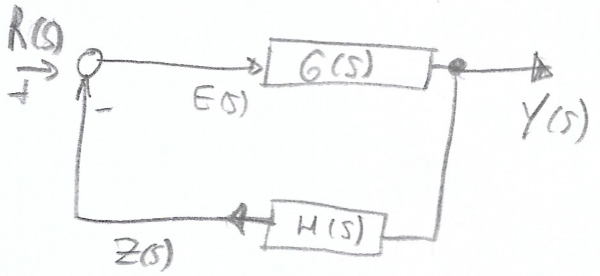
$\cancel{(I+GH)(I+GH)^{-1}}G = (I+GH)G(I+L)^{-1}$

$G(I+L) = (I+GH)G\cancel{(I+L)^{-1}}\cancel{(I+L)}$

$\cancel{GI}+GL = \cancel{GI}+(GH)G$, como $GH = L = HG$

$GL = G(HG) = GL$ ✓

2)



$Z(s) = H(s)\,Y(s)$

$Y(s) = G(s)\,E(s)$

$E(s) = R(s) - Z(s)$

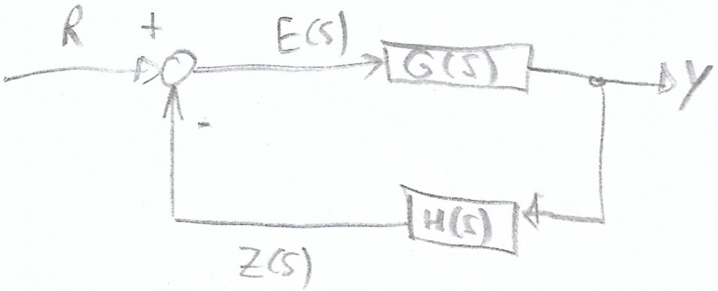
$Z = HG(R-Z) \rightarrow Z = HGR - HGZ \rightarrow (HG+1)Z = HGR$

$\rightarrow (HG+I)Z = HGR$

$\frac{Z}{R} = \frac{HG}{HG+1} = \frac{L}{1+L}$

$ZR^{-1} = (HG+I)^{-1}(HG)$

3)

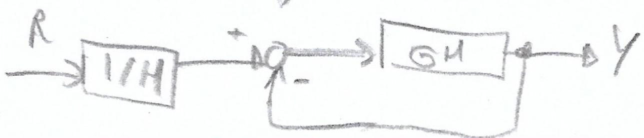


$Z(s) = H(s)Y$

$E(s) = R - Z(s) = R - H(s)Y$

$Y = G(s)\,E(s) = G(s)\,(R - H(s)Y)$

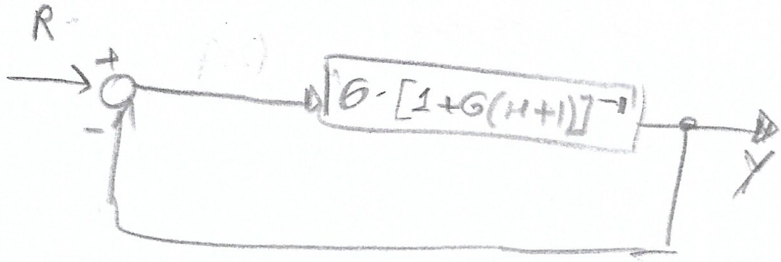
⇕ =



$Y(I - G_{(s)}H(s)) = G_{(s)}R$

$\boxed{Y = GR(I-GH)^{-1}}$

4)



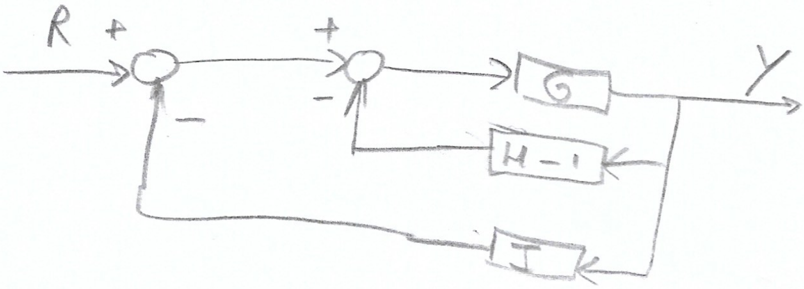
$$Y=(R-Y)\,G[1+G(H-1)]^{-1}$$

$$\cancel{Y=}\left(\frac{R}{Y}\cancel{-1}\right)=\frac{1+G(H-1)}{G}+1$$

$$R/Y=\frac{1+GH\cancel{-G}\cancel{+G}}{G}$$

$$\boxed{Y=\frac{GR}{1+GH}}$$

5)

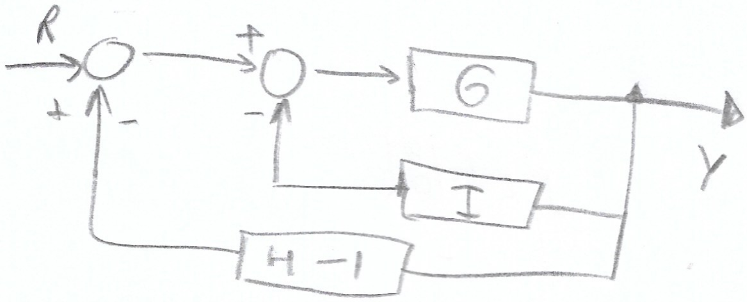


$$Y=(R-Y(H-\cancel{I}+I))G$$

$$Y+YHG=RG$$

$$\boxed{Y=\frac{RG}{1+HG}}$$

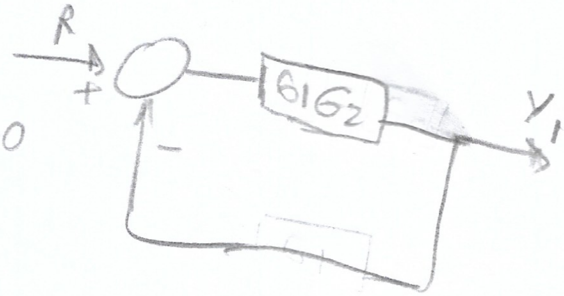
6)



$$Y=(R-Y(H-I+I))G$$

$$\boxed{Y=\frac{RG}{1+HG}}$$

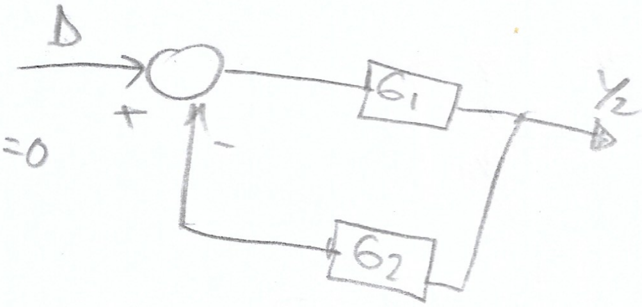
7)



$$Y_1=(R-Y_1)G_1G_2$$

$$\boxed{Y_1=\frac{RG_1G_2}{1+G_1G_2}}$$

8)

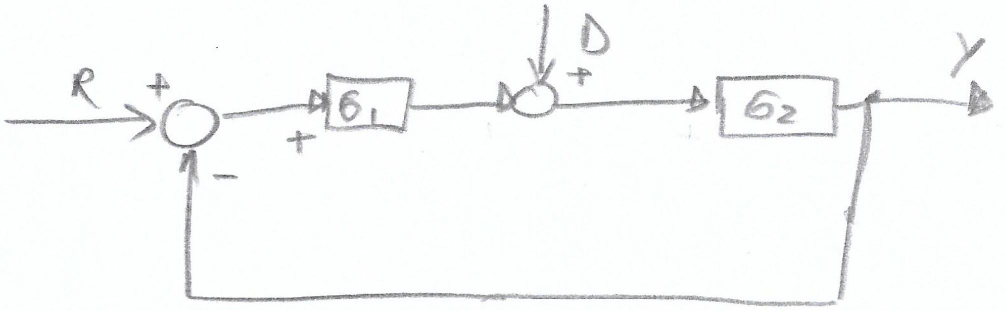


$$Y_2=[D-Y_2(G_1)]G_2$$

$$Y_2(1+G_1G_2)=DG_2$$

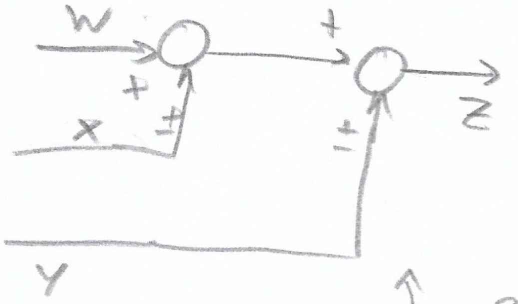
$$\boxed{Y_2=\frac{DG_2}{1+G_1G_2}}$$

a)



$$Y_1 + Y_2 = \frac{R G_1 G_2}{I + G_1 G_2} + \frac{D G_2}{I + G_1 G_2} = \boxed{\frac{(R G_1 + D) G_2}{I + G_1 G_2} = Y}$$

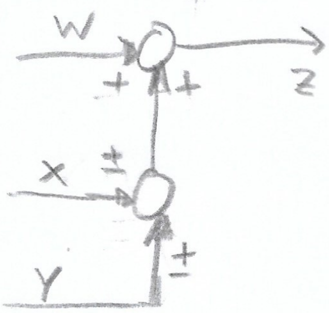
10)



$\rightarrow Z = (W \pm X) \pm Y$

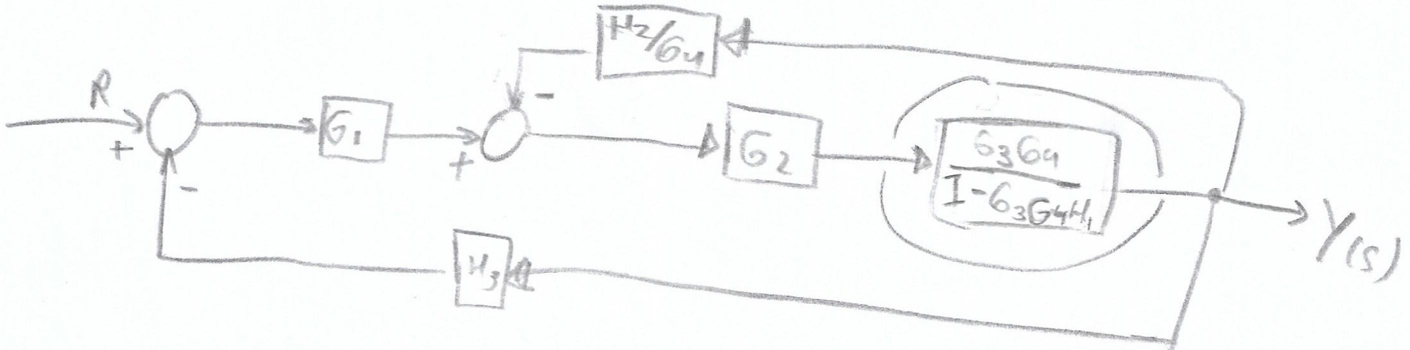
$=?$

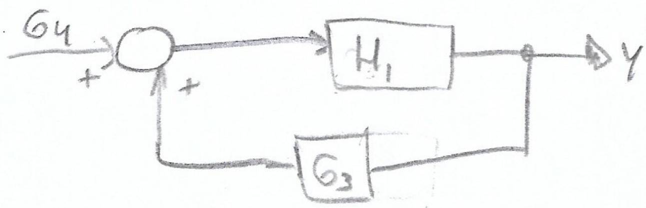
batam!



$\rightarrow Z = W \pm (X \pm Y)$

11)





$$\boxed{Y' = \frac{G_3 G_4}{I - G_3 G_4 H_1}}$$