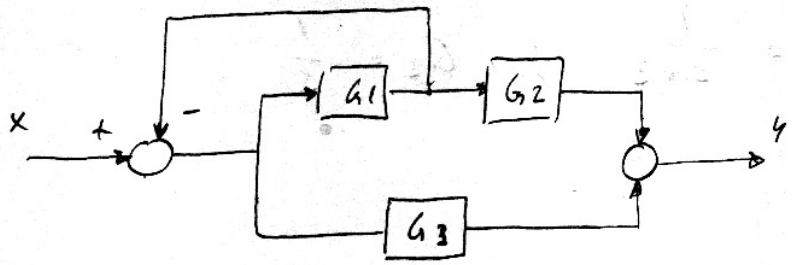
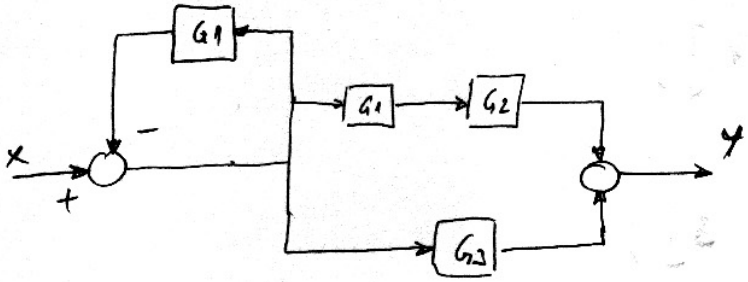
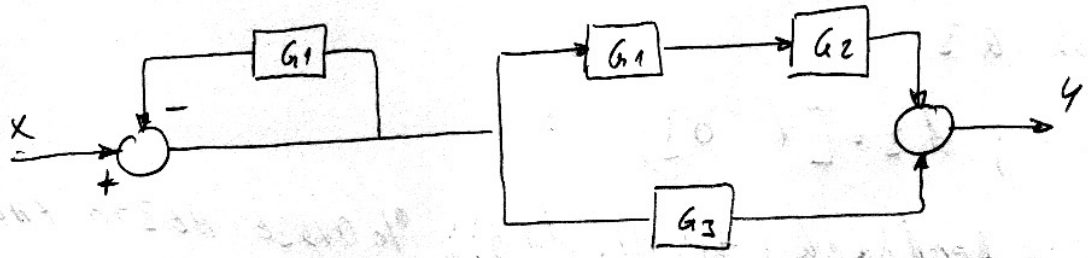
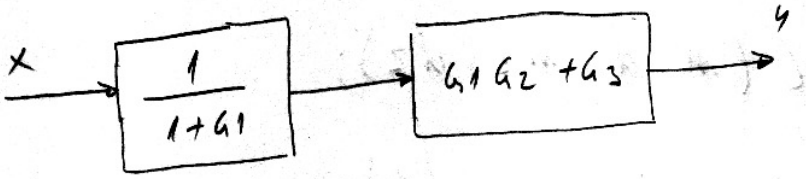
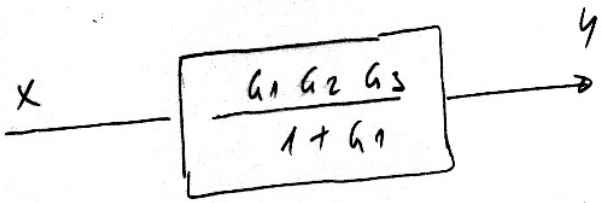
1.


X
+
-
G1
G2
G3
Y


G1
X
-
+
G1
G2
G3
Y


G1
X
-
+
G1
G2
G3
Y


X
1
1+G1
G1 G2 +G3
Y

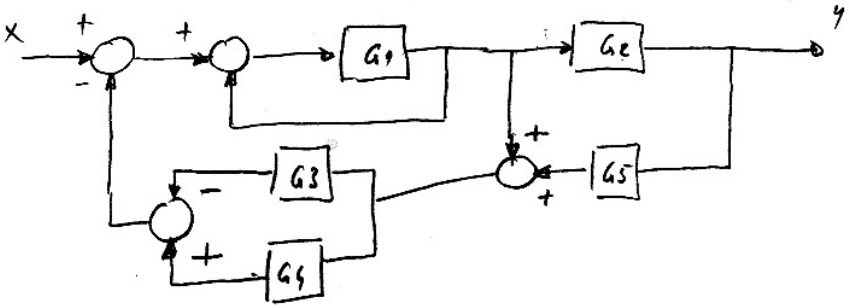

X
G1 G2 G3
1 + G1
Y

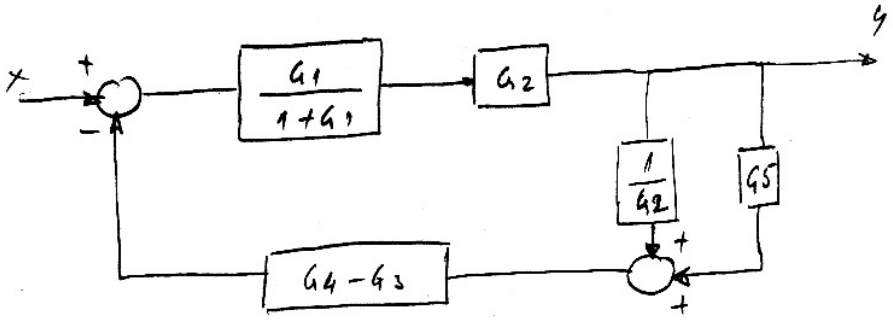
$G_1 = \frac{1}{s+1}$; $G_2 = \frac{1}{s+3}$; $G_3 = \frac{1}{s}$

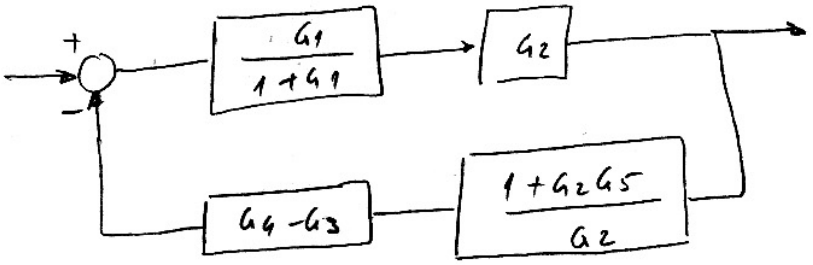
.m

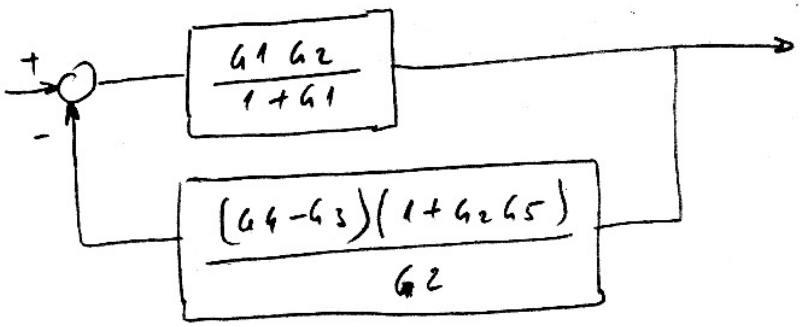
```
% blok G1
m1 = 1; d1 = [1 1];
% blok G2
m2 = 1; d2 = [1 3];
% blok G3
m3 = 1; d3 = [1 0];
[m4,d4] = feedback(-1, m1, d1); % OVDJE NEŠTO FALI
[m,d] = series(m1, d1, m2, d2);
[m,d] = parallel(m, d, m3, d3);
[m,d] = series(m, d, m4, d4);
```

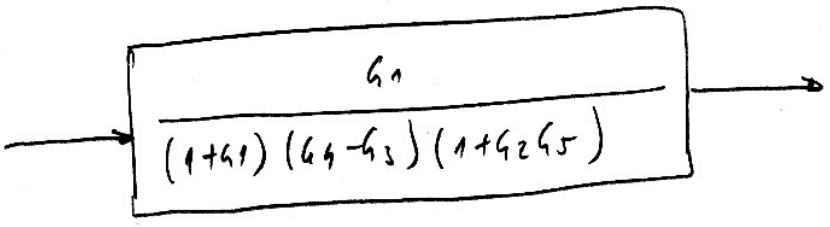
2.


x
y
G1
G2
G3
G4
G5

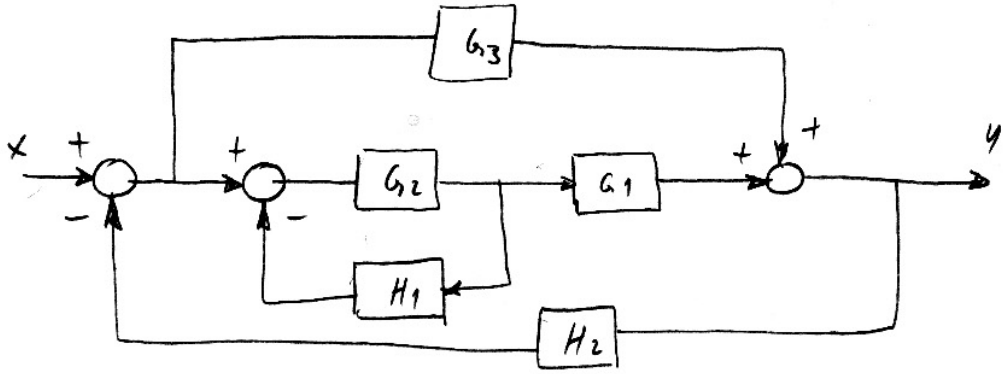

x
y
$\frac{G_1}{1+G_1}$
G_2
$\frac{1}{G_2}$
G_5
$G_4 - G_3$

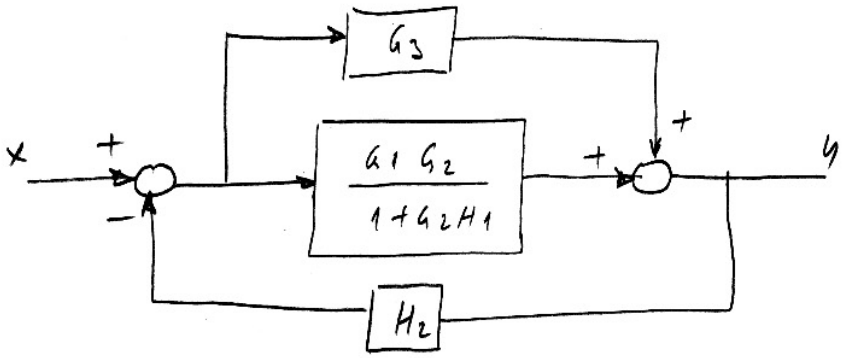

$\frac{G_1}{1+G_1}$
G_2
$G_4 - G_3$
$\frac{1+G_2G_5}{G_2}$


$\frac{G_1 G_2}{1+G_1}$
$\frac{(G_4-G_3)(1+G_2G_5)}{G_2}$


$\frac{G_1}{(1+G_1)(G_4-G_3)(1+G_2G_5)}$

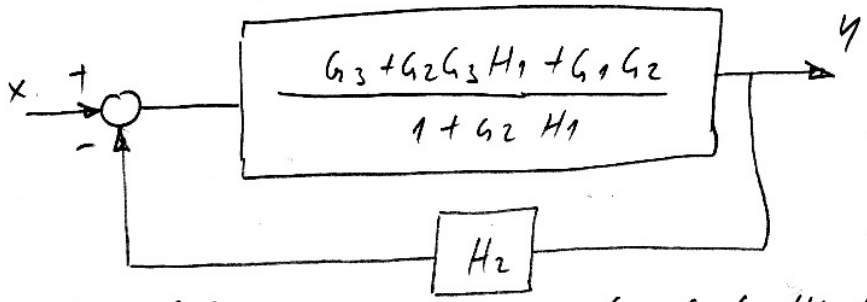
3.



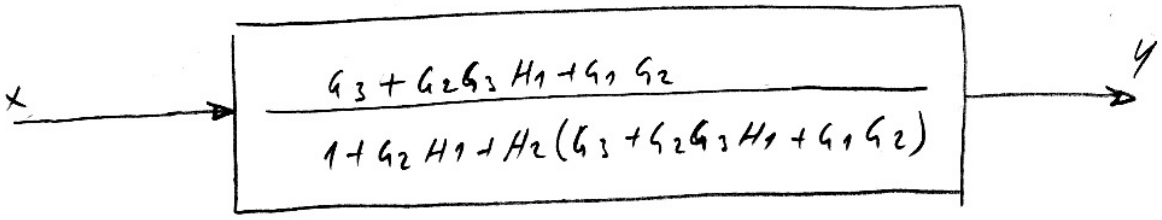


$$G_3 + \frac{G_1 G_2}{1+G_2H_1} =$$

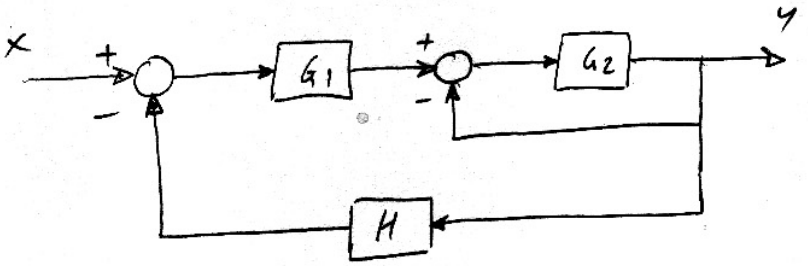
$$= \frac{G_3 + G_2G_3H_1 + G_1G_2}{1+G_2H_1}$$

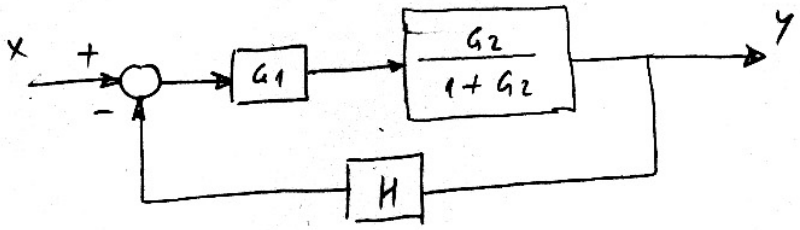


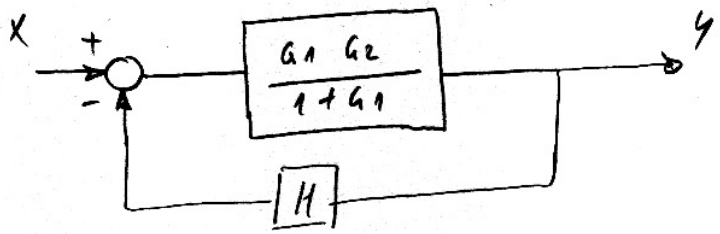
$$\frac{\frac{G_3+G_2G_3H_1+G_1G_2}{1+G_2H_1}}{1+\frac{H_2(G_3+G_2G_3H_1+G_1G_2)}{1+G_2H_1}} = \frac{\frac{G_3+G_2G_3H_1+G_1G_2}{1+G_2H_1}}{\frac{1+G_2H_1+H_2(G_3+G_2G_3H_1+G_1G_2)}{1+G_2H_1}}$$



4.

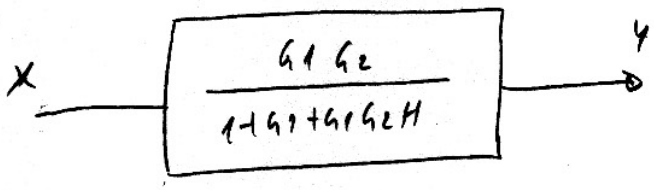




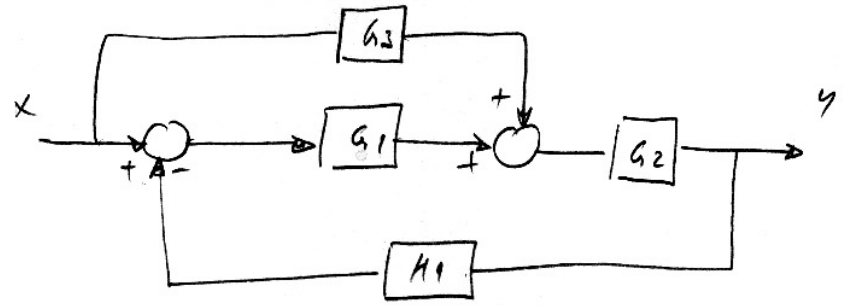


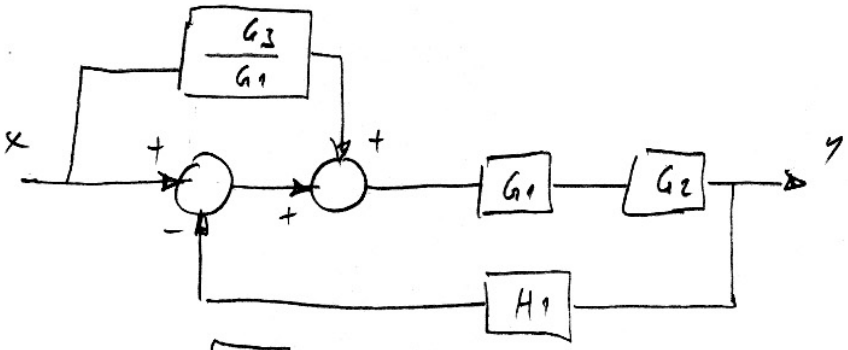
$$\frac{\frac{G_1 G_2}{1+G_1}}{1+\frac{G_1 G_2 H}{1+G_1}} =$$

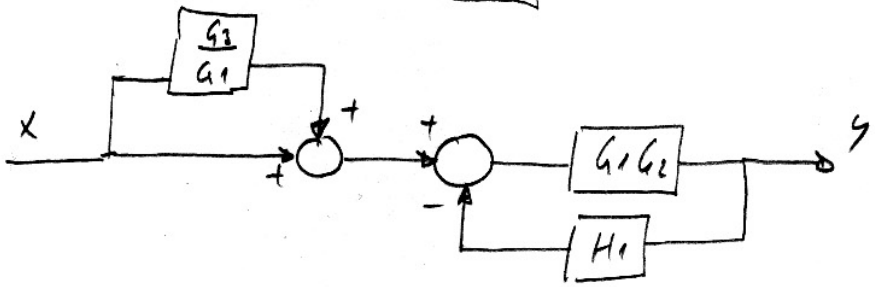
$$= \frac{\frac{G_1 G_2}{1+G_1}}{\frac{1+G_1+G_1 G_2 H}{1+G_1}}$$

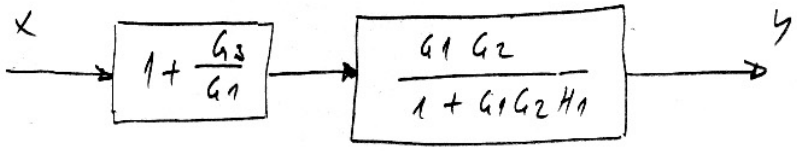


5.

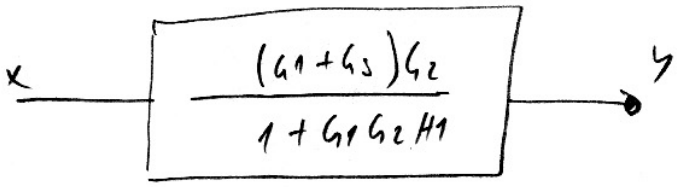




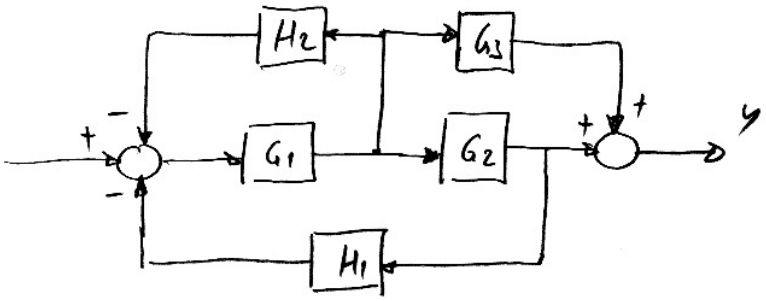


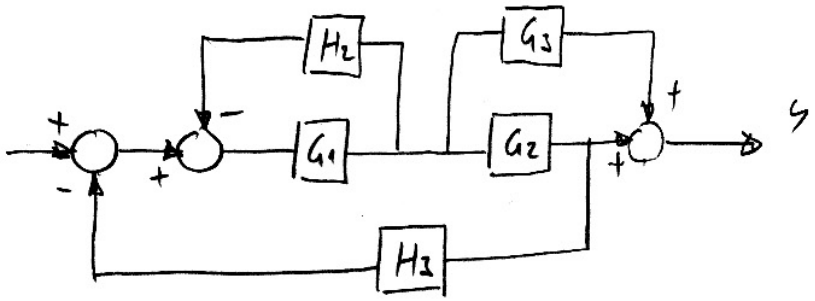


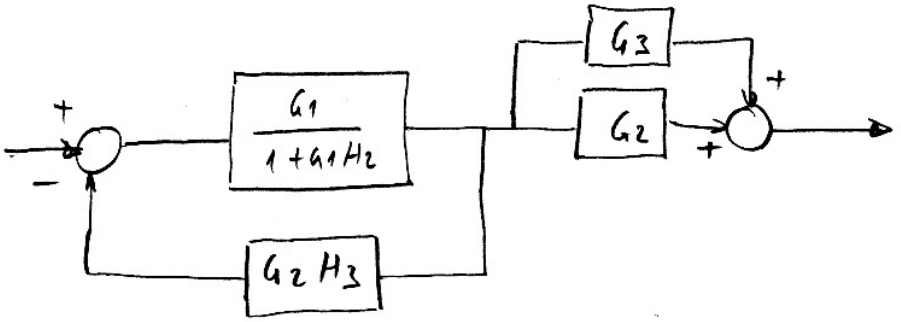
$\frac{G_1+G_3}{G_1} \quad \frac{G_1 G_2}{1+G_1G_2H_1}$



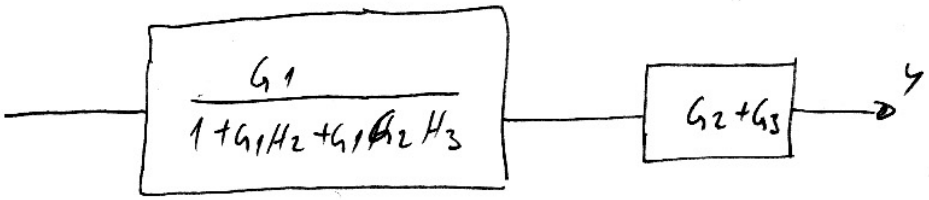
6.

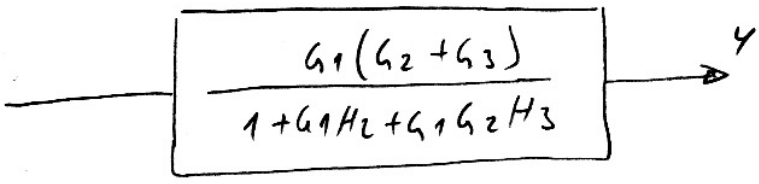


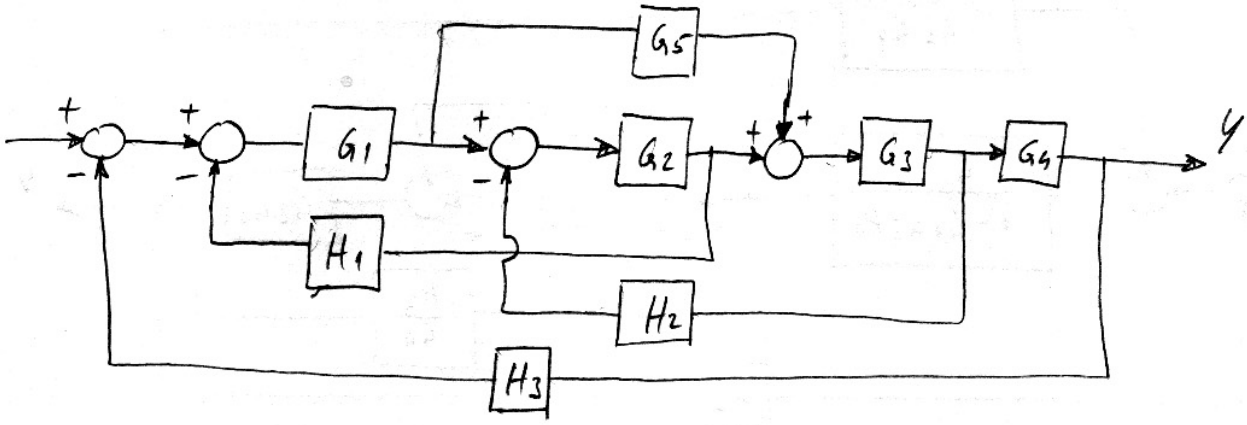


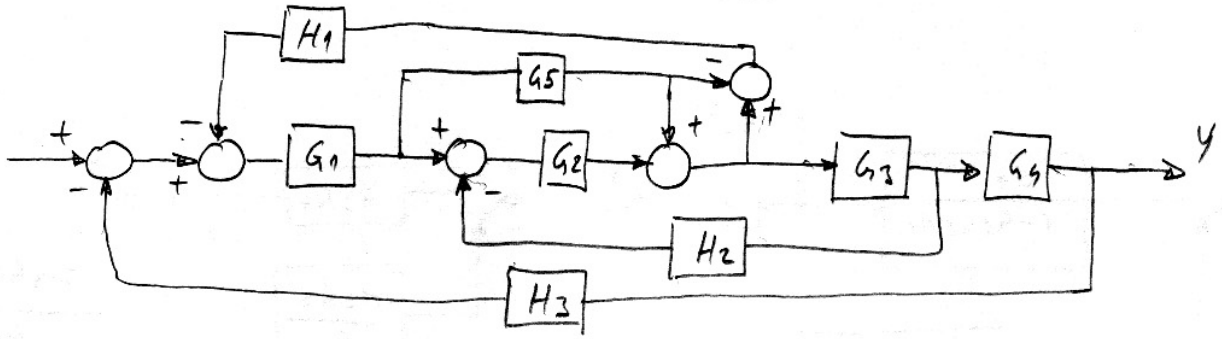


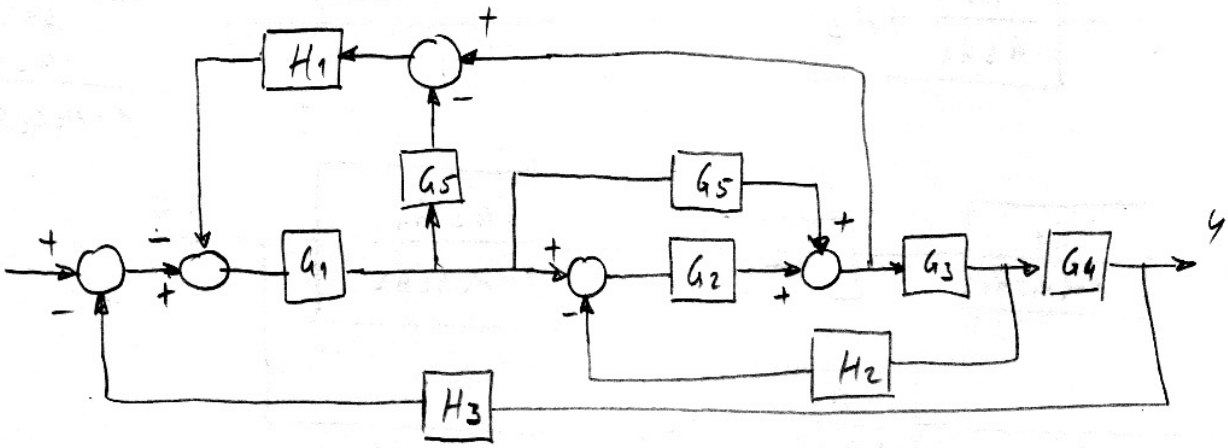
$$\frac{\frac{G_1}{1+G_1H_2}}{1+\frac{G_1G_2H_3}{1+G_1H_2}} = \frac{\frac{G_1}{1+G_1H_2}}{\frac{1+G_1H_2+G_1G_2H_3}{1+G_1H_2}} = \frac{G_1}{1+G_1H_2+G_1G_2H_3}$$

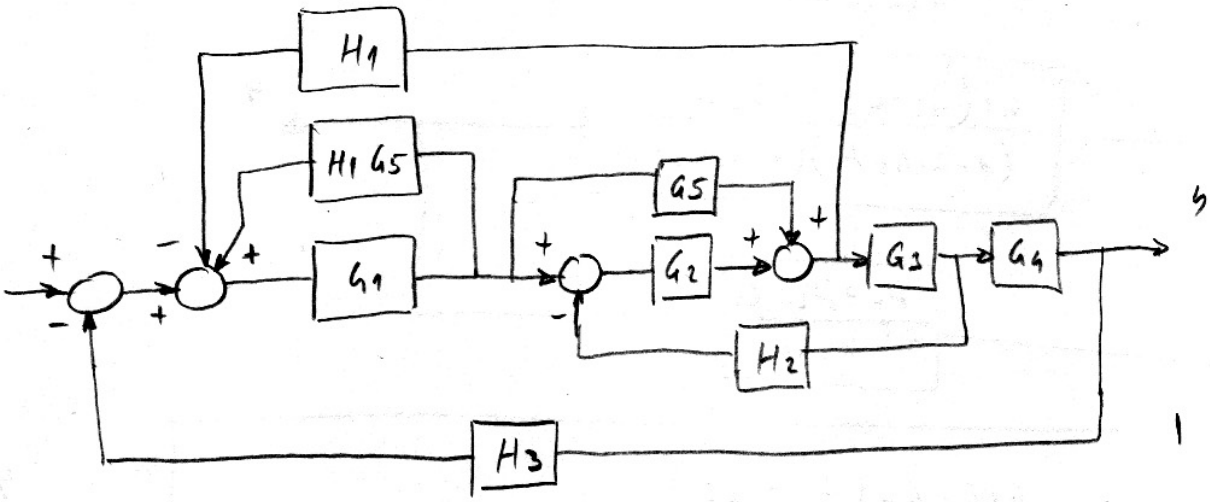




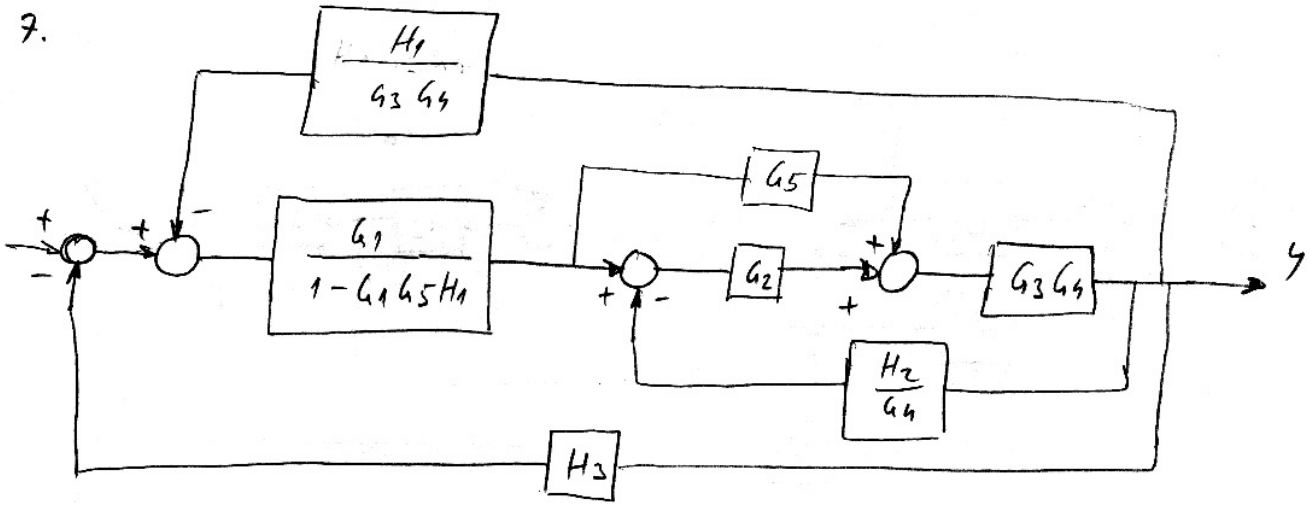

G5
G1
G2
G3
G4
y
H1
H2
H3

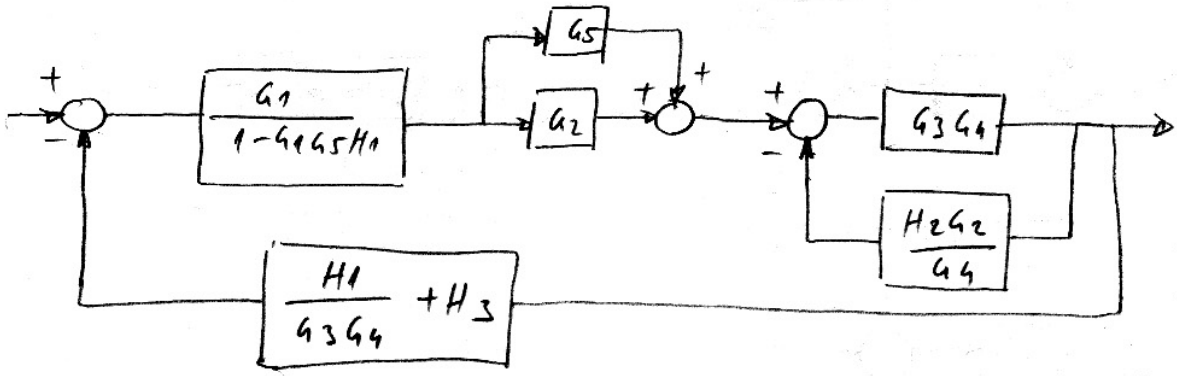

H1
G5
G1
G2
G3
G4
y
H2
H3


H1
G5
G5
G1
G2
G3
G4
y
H2
H3

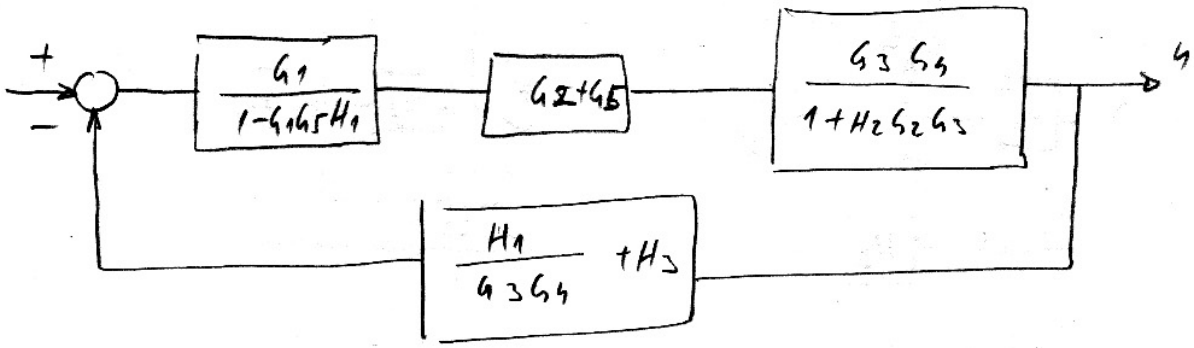

H1
H1 G5
G5
G1
G2
G3
G4
y
H2
H3

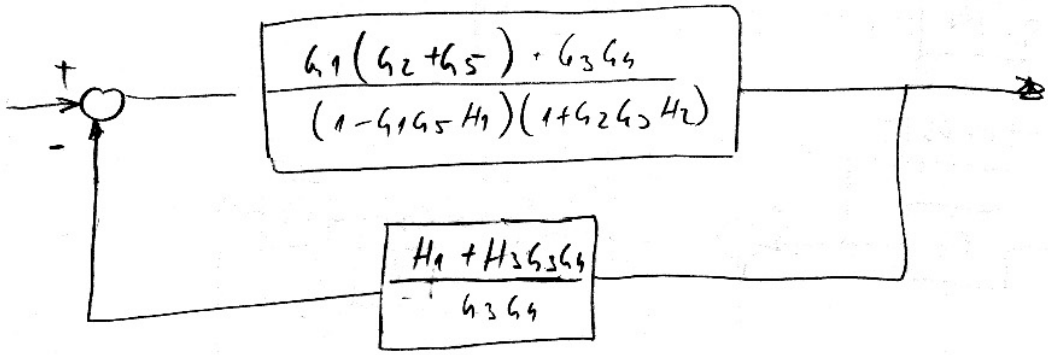
7.





$$\frac{G_3 G_4}{1 + \frac{H_2 G_2 G_3 G_4}{G_4}} = \frac{G_3 G_4}{1 + H_2 G_2 G_3}$$

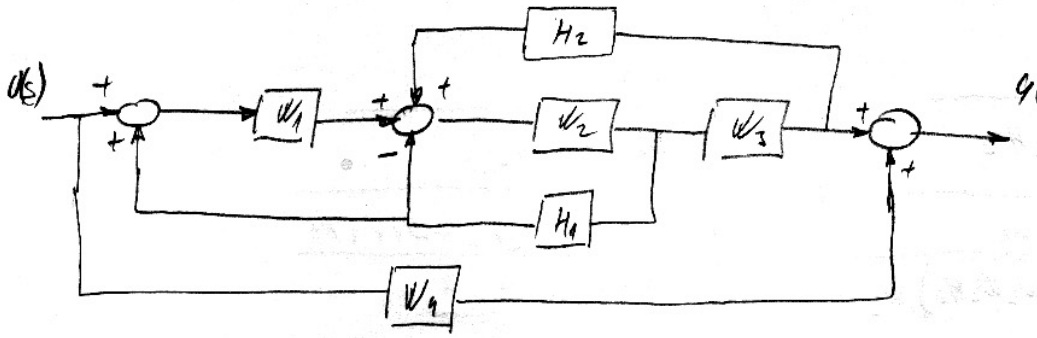


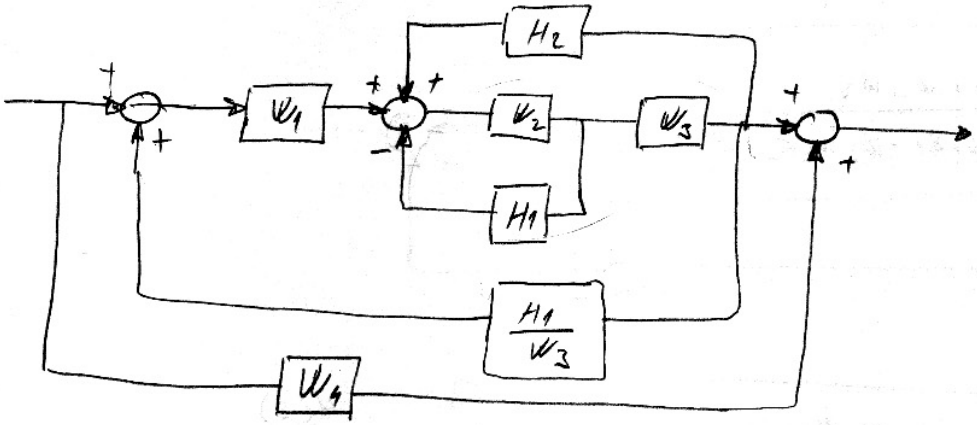


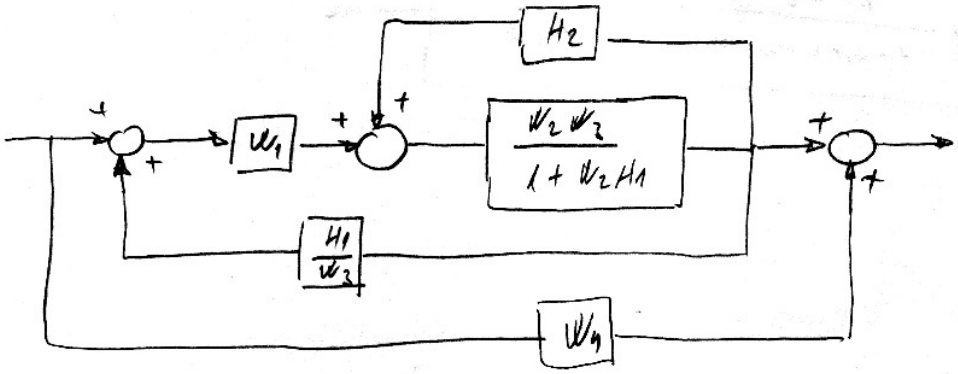
$$\frac{G_1 G_2 G_4 (G_2 + G_5)}{(1 - G_1 G_5 H_1)(1 + G_2 G_3 H_2) + G_1 (G_2 + G_5)(H_1 + H_3 G_3 G_4)}$$

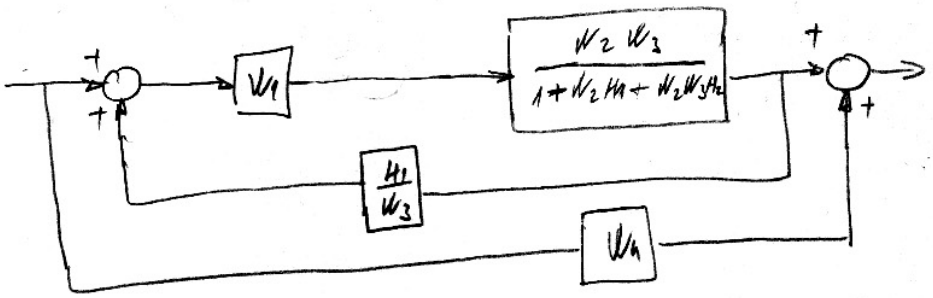
y

8.

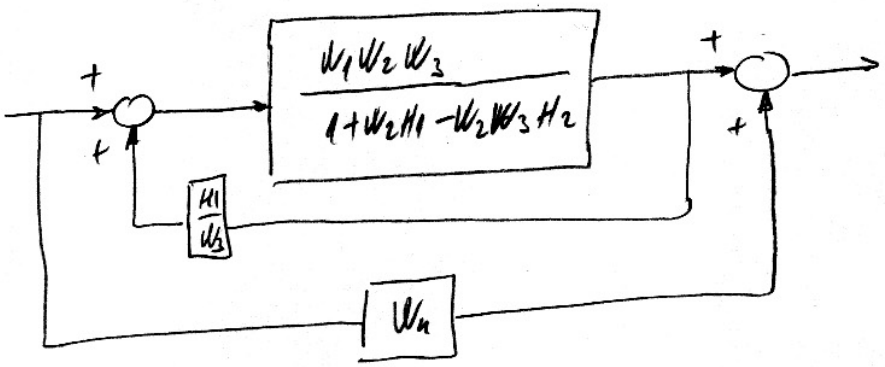




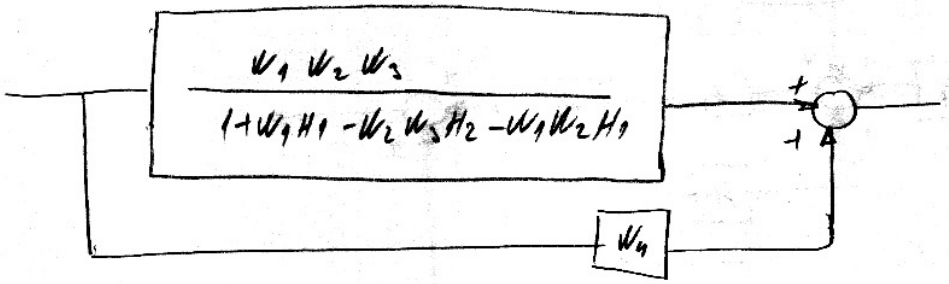


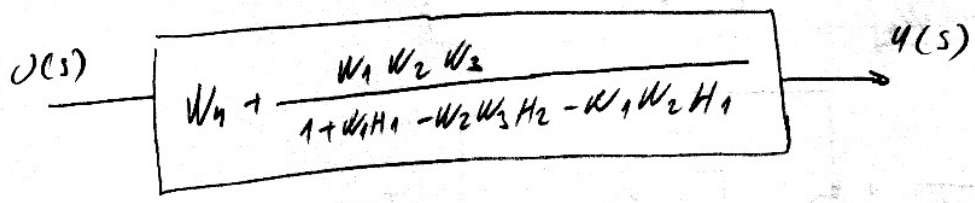


$$\frac{\frac{W_2 W_3}{1+W_2 H_1}}{1-\frac{W_2 W_3 H_2}{1+W_2 H_1}} = \frac{\frac{W_2 W_3}{1+W_2 H_1}}{\frac{1+W_2 H_1 - W_2 W_3 H_2}{1+W_2 H_1}} = \frac{W_2 W_3}{1+W_2 H_1 - W_2 W_3 H_2}$$

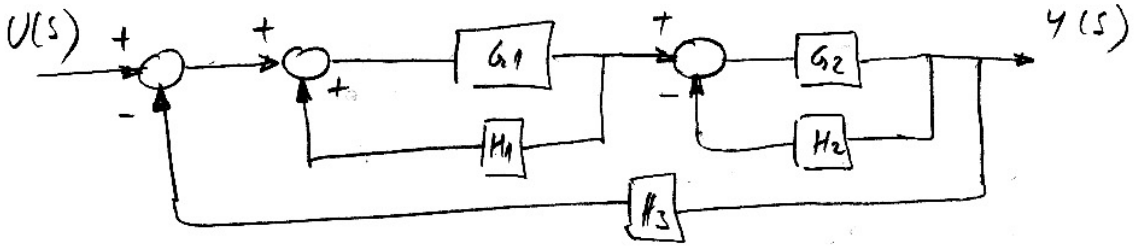


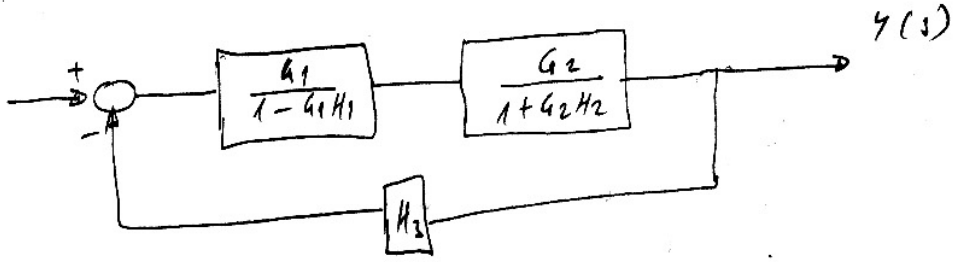
$$\frac{\frac{W_1 W_2 W_3}{1 + W_1 H_1 - W_2 W_3 H_2}}{1 - \frac{W_1 W_2 W_3 H_1}{(1 + W_1 H_1 - W_2 W_3 H_2) W_3}} = \frac{W_1 W_2 W_3}{1 + W_1 H_1 - W_2 W_3 H_2 - W_1 W_2 H_1}$$

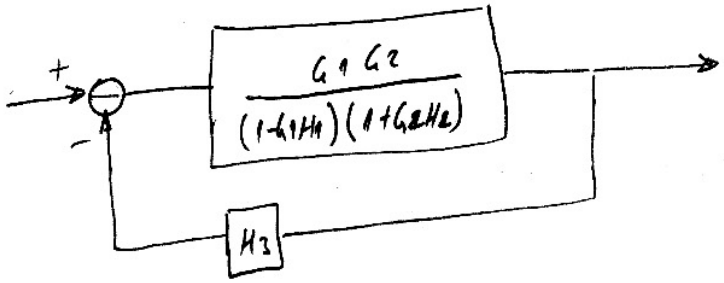




9.

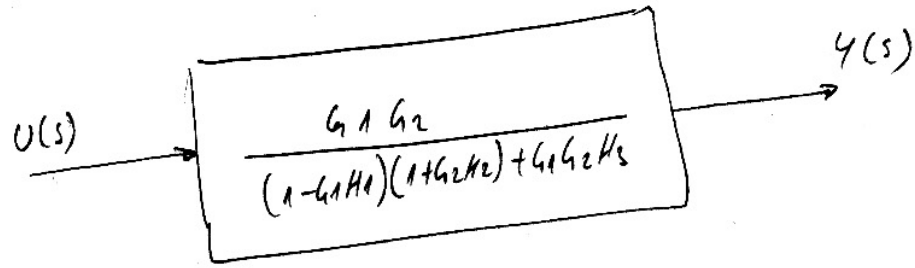




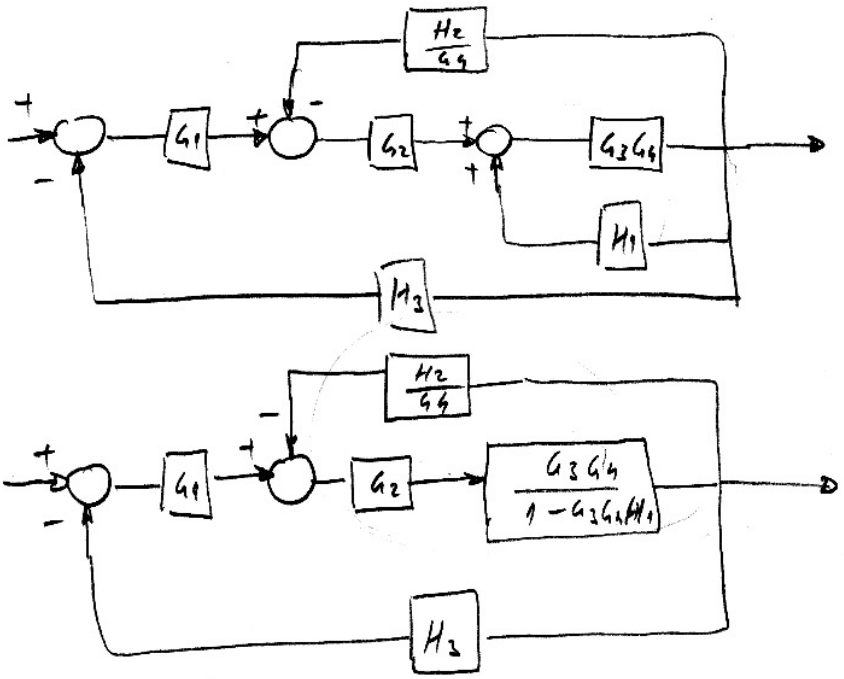


$$\frac{G_1}{1-G_1H_1}\cdot\frac{G_2}{1+G_2H_2}=\frac{G_1G_2}{(1-G_1H_1)(1+G_2H_2)}$$

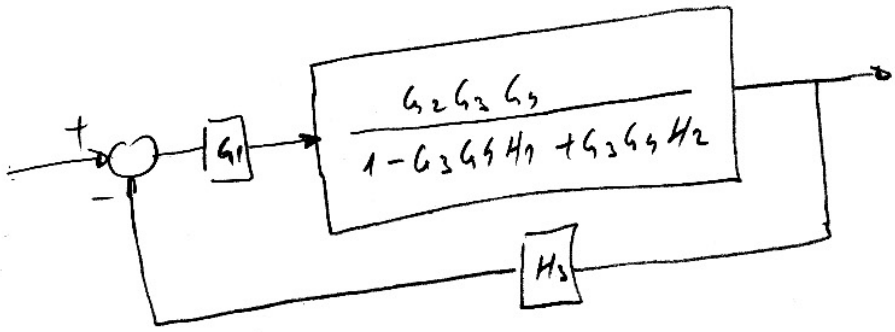
$$\frac{\dfrac{G_1G_2}{(1-G_1H_1)(1+G_2H_2)}}{1+\dfrac{G_1G_2H_3}{(1-G_1H_1)(1+G_2H_2)}}=\frac{\dfrac{G_1G_2}{(1-G_1H_1)(1+G_2H_2)}}{\dfrac{(1-G_1H_1)(1+G_2H_2)+G_1G_2H_3}{(1-G_1H_1)(1+G_2H_2)}}=\frac{G_1G_2}{(1-G_1H_1)(1+G_2H_2)+G_1G_2H_3}$$



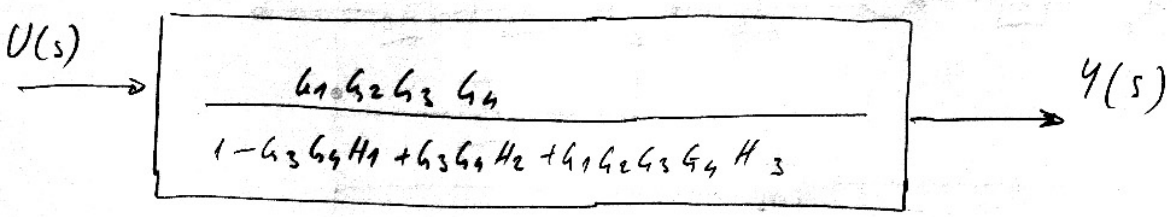
10. $U(s)$ $Y(s)$ G_1 G_2 G_3 G_4 H_1 H_2 H_3



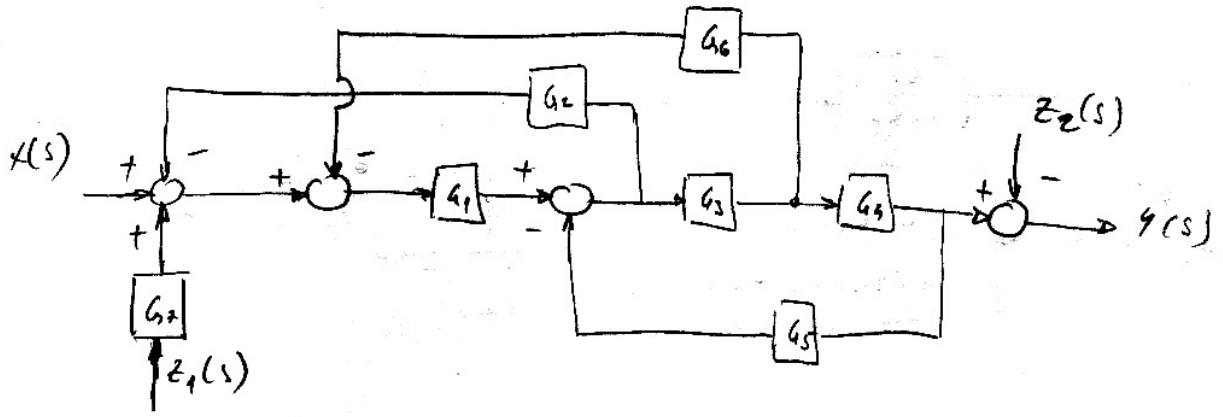
$$\frac{\frac{G_2G_3G_4}{1-G_3G_4H_1}}{1+\frac{G_2G_3G_4H_2}{(1-G_3G_4H_1)G_2}} = \frac{\frac{G_2G_3G_4}{1-G_3G_4H_1}}{\frac{1-G_3G_4H_1+G_3G_4H_2}{1-G_3G_4H_1}}$$



$$\frac{\frac{G_1G_2G_3G_4}{1-G_3G_4H_1+G_3G_4H_2}}{1+\frac{G_1G_2G_3G_4H_3}{1-G_3G_4H_1+G_3G_4H_2}} = \frac{\frac{G_1G_2G_3G_4}{1-G_3G_4H_1+G_3G_4H_2}}{\frac{1-G_3G_4H_1+G_3G_4H_2+G_1G_2G_3G_4H_3}{1-G_3G_4H_1+G_3G_4H_2}}$$


U(s)
$\frac{G_1 G_2 G_3 G_4}{1 - G_3 G_4 H_1 + G_3 G_4 H_2 + G_1 G_2 G_3 G_4 H_3}$
Y(s)

11.

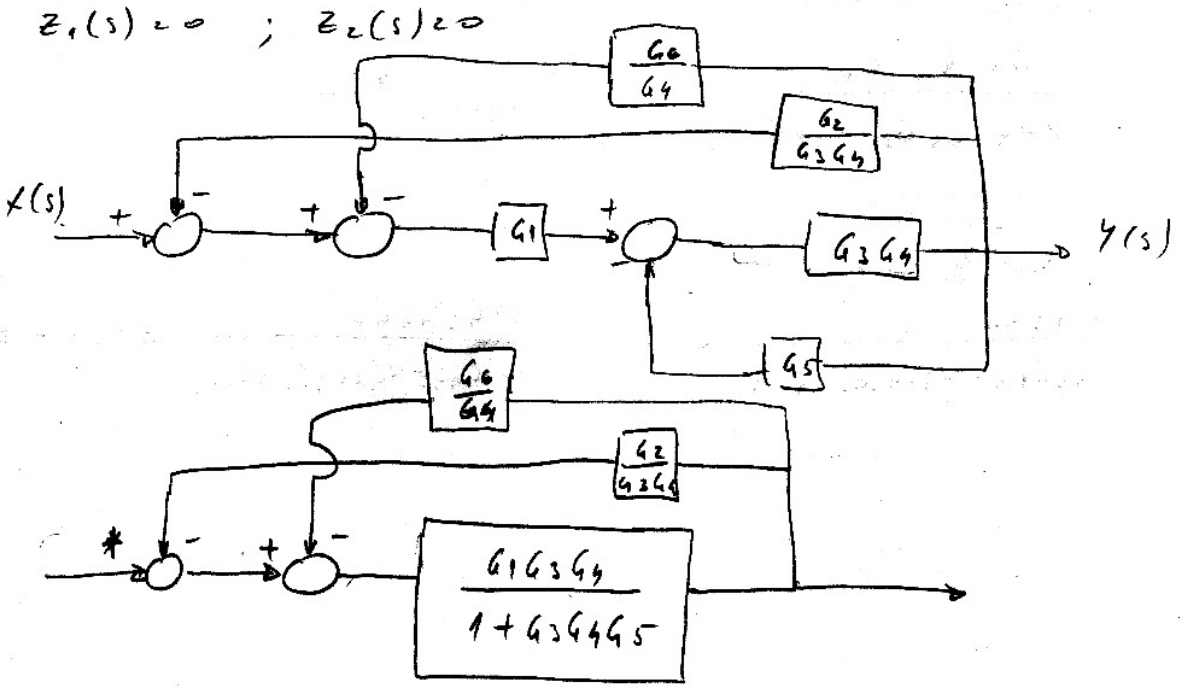


$$Y(s) = G_x(s) X(s) + G_{z1}(s) Z_1(s) + G_{z2}(s) Z_2(s)$$

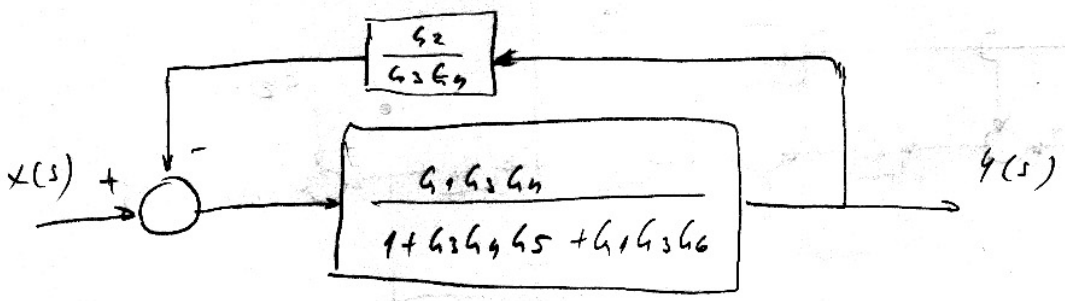
$$G_{z1} = G_7 \cdot G_x$$

$$G_{z2} = -1$$

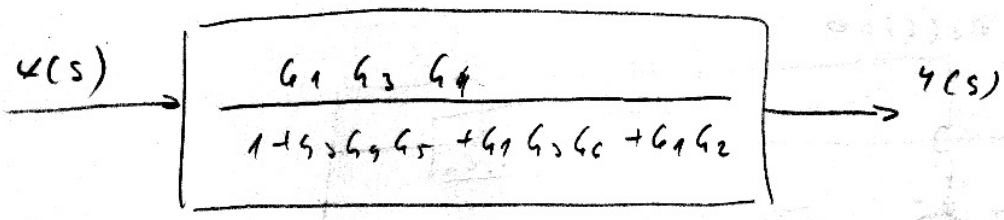
$Z_1(s) = 0 \quad ; \quad Z_2(s) = 0$



$$\frac{\frac{G_1 G_3 G_4}{1 + G_3 G_4 G_5}}{1 + \frac{G_1 G_3 G_4 G_6}{(1 + G_3 G_4 G_5) G_4}} = \frac{\frac{G_1 G_3 G_4}{1 + G_3 G_4 G_5}}{\frac{1 + G_3 G_4 G_5 + G_1 G_3 G_6}{1 + G_3 G_4 G_5}} = \frac{G_1 G_3 G_4}{1 + G_3 G_4 G_5 + G_1 G_3 G_6}$$



$$\frac{\dfrac{G_1 G_3 G_4}{1 + G_3 G_4 G_5 + G_1 G_3 G_6}}{1 + \dfrac{G_1 G_3 G_4 G_2}{(1 + G_3 G_4 G_5 + G_1 G_3 G_6) G_3 G_4}} = \frac{\dfrac{G_1 G_3 G_4}{1 + G_3 G_4 G_5 + G_1 G_3 G_6}}{\dfrac{1 + G_3 G_4 G_5 + G_1 G_3 G_6 + G_1 G_2}{1 + G_3 G_4 G_5 + G_1 G_3 G_6}}$$



$$y(s) = \frac{G_1 G_3 G_4}{1 + G_3 G_4 G_5 + G_1 G_3 G_6 + G_1 G_2} x(s) + \frac{G_1 G_3 G_4 G_7}{1 + G_3 G_4 G_5 + G_1 G_3 G_6 + G_1 G_2} z_1(s) - z_2(s)$$

1