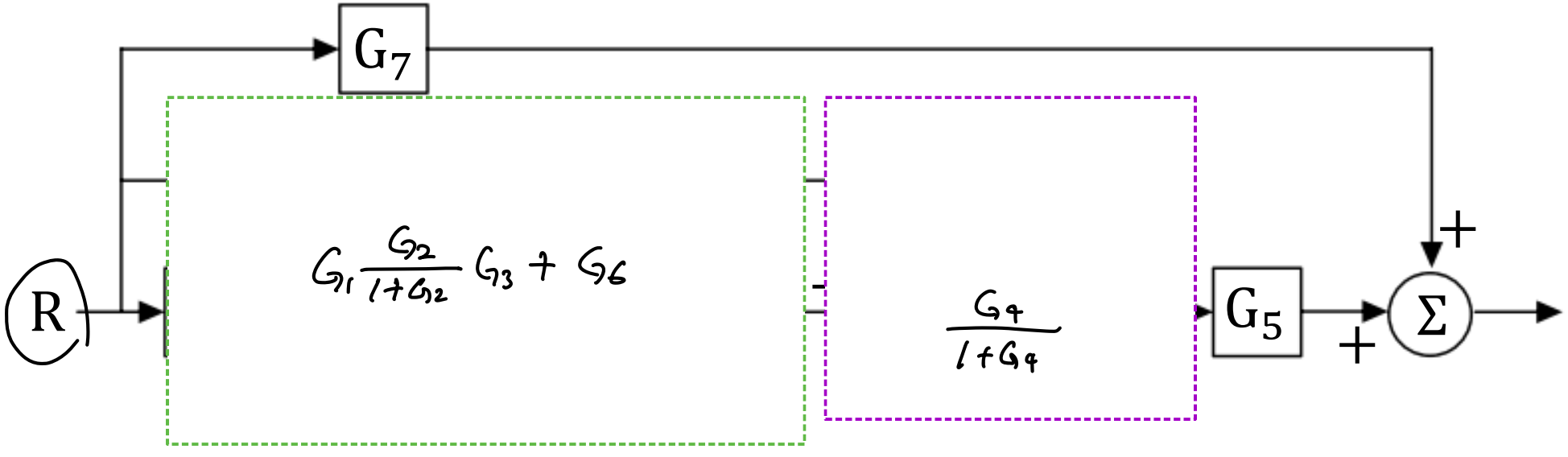
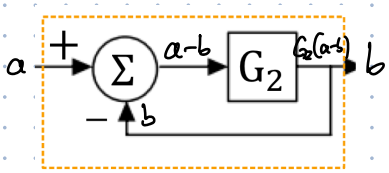
자동제어 한방에 끝내기

1. Block Diagram

Block Diagram

- 예시 문제





$$\frac{G_2}{1+G_2}$$

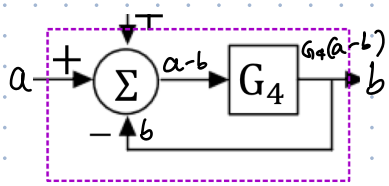
$$b = G_2(a-b)$$

$$b = G_2 a - G_2 b$$

$$b + G_2 b = G_2 a$$

$$(1+G_2)b = G_2 a$$

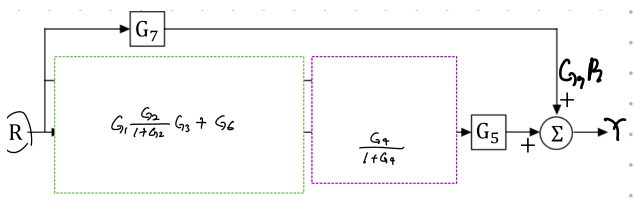
$$b = \frac{G_2}{1+G_2} a$$



$$b = G_4(a-b)$$

$$(1+G_4)b = G_4 a$$

$$b = \frac{G_4}{1+G_4} a$$



$$Y = G_7 R + \square \cdot \square \cdot G_5 R$$

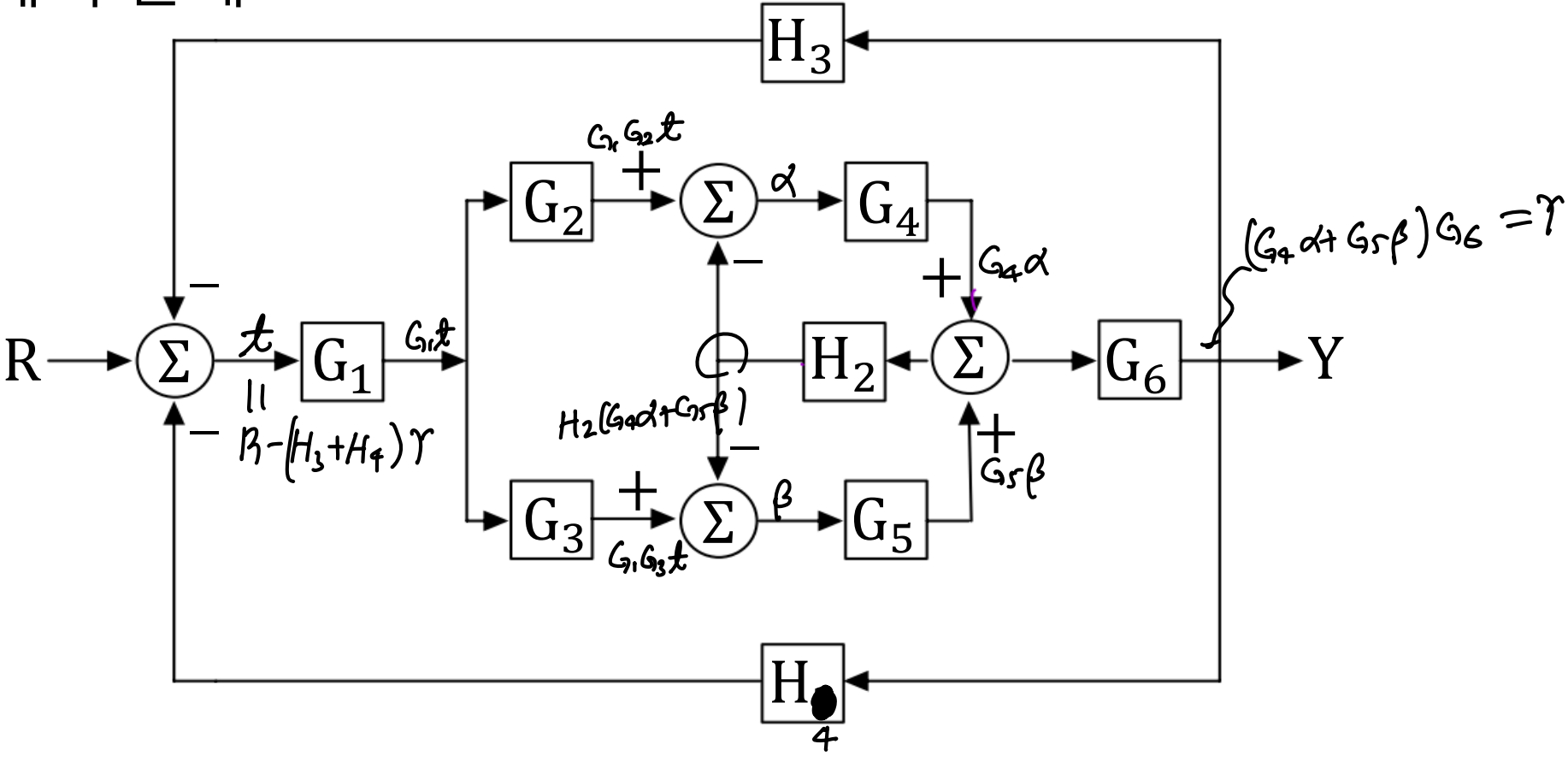
$$= G_7 R + \left(\frac{G_1 G_2 G_3}{1+G_2} + G_6\right)\left(\frac{G_4}{1+G_4}\right) \cdot G_5 R$$

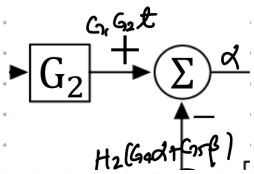
$$= \left[G_7 + \left(\frac{G_1 G_2 G_3}{1+G_2} + G_6\right)\left(\frac{G_4}{1+G_4}\right) G_5\right] R$$

$$\frac{Y}{R} = \left[G_7 + \left(\frac{G_1 G_2 G_3}{1+G_2} + G_6\right)\left(\frac{G_4}{1+G_4}\right) G_5\right]$$

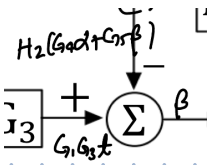
Block Diagram

- 예시 문제





$$G_4\alpha = \left[G_1G_2t - H_2(G_4\alpha + G_5\beta)\right]G_4$$



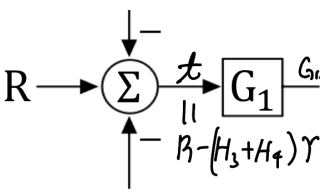
$$G_5\beta = \left[G_1G_3t - H_2(G_4\alpha+G_5\beta)\right]G_5$$

$$G_4\alpha + G_5\beta = (G_1G_2G_4 + G_1G_3G_5)t - H_2(G_4\alpha+G_5\beta)(G_4+G_5)$$

$$\{1 + H_2(G_4+G_5)\}(G_4\alpha+G_5\beta) = (G_1G_2G_4 + G_1G_3G_5)t$$

$$(G_4\alpha+G_5\beta) = \frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}t$$

$$Y = G_6(G_4\alpha+G_5\beta) = G_6\frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}t$$



$$t = R - (H_2+H_4)Y$$

$$R = t + (H_3+H_4)G_6\frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}t$$

$$R = t\left\{1 + \frac{G_6(H_3+H_4)(G_1G_2G_4 + G_1G_3G_5)}{1+H_2(G_4+G_5)}\right\}$$

$$t = \left\{1 + \frac{G_6(H_3+H_4)(G_1G_2G_4 + G_1G_3G_5)}{1+H_2(G_4+G_5)}\right\}^{-1}R$$

$$Y = G_6(G_4\alpha + G_5\beta) = G_6\frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}R$$

$$= G_6\frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}\left\{1 + \frac{G_6(H_3+H_4)(G_1G_2G_4 + G_1G_3G_5)}{1+H_2(G_4+G_5)}\right\}^{-1}R$$

$$\frac{Y}{R} = G_6\frac{G_1G_2G_4 + G_1G_3G_5}{1+H_2(G_4+G_5)}\left\{1 + \frac{G_6(H_3+H_4)(G_1G_2G_4 + G_1G_3G_5)}{1+H_2(G_4+G_5)}\right\}^{-1}$$