2.3 方块图
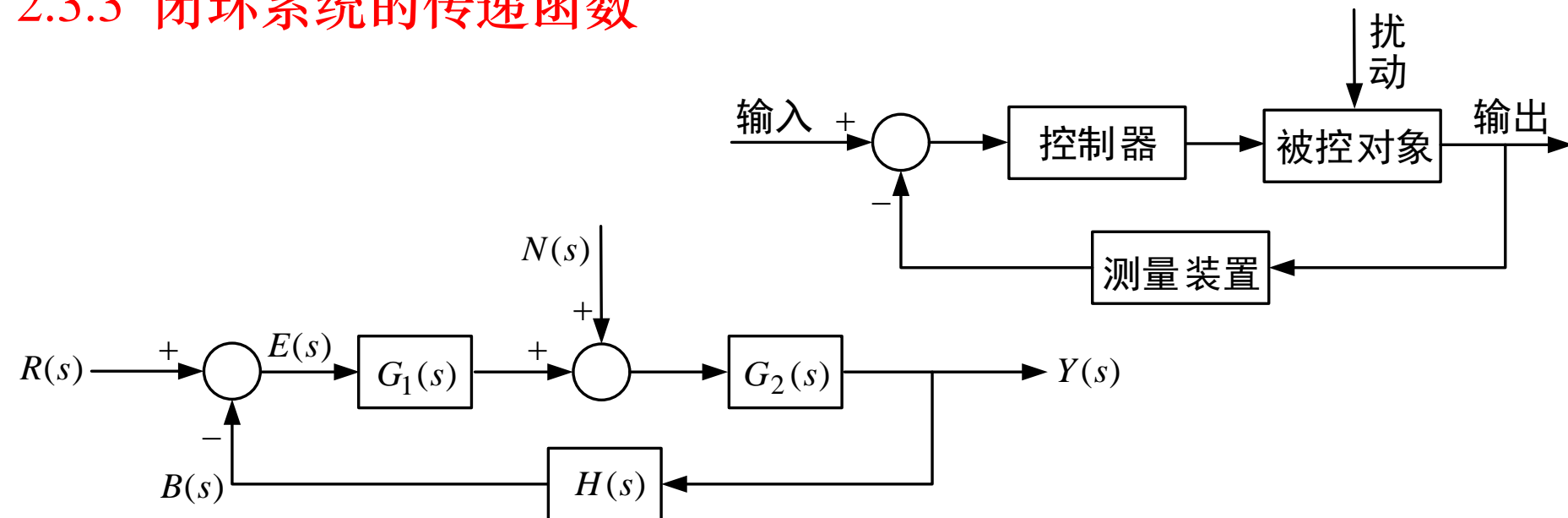
2.3.1 方块图的组成
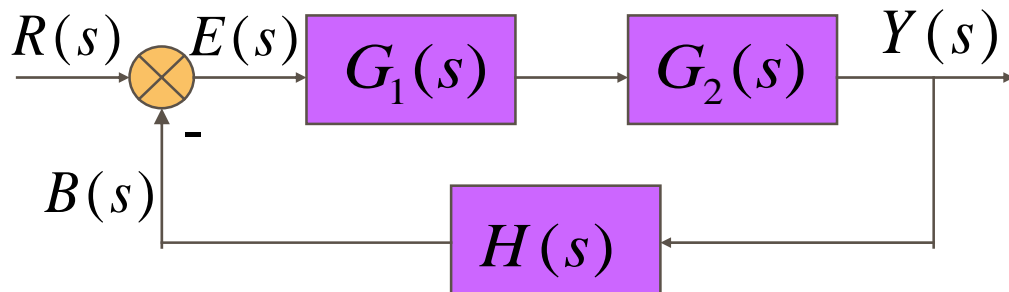
2.3.2 方块图的等效变换和绘制

2.3.3 闭环系统的传递函数

2.3.3 闭环系统的传递函数
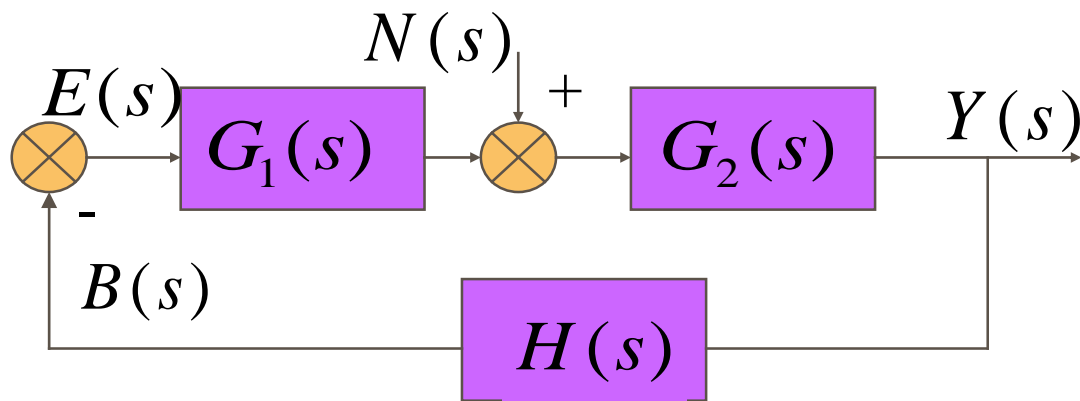

1．输入量作用下的闭环传递函数

$$\Phi(s) = \frac{Y(s)}{R(s)}$$

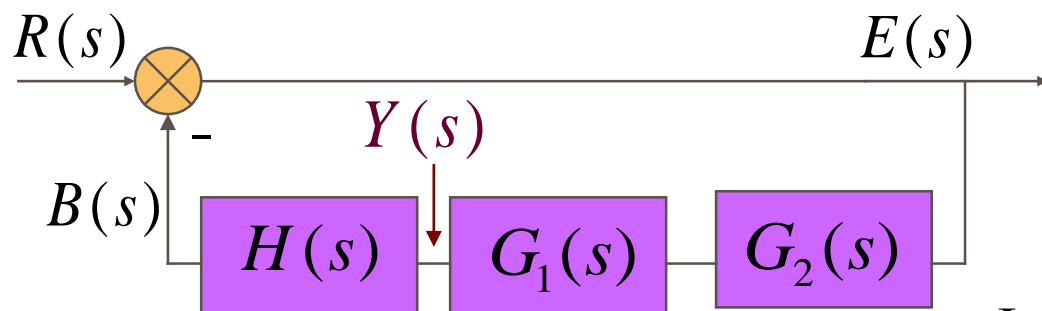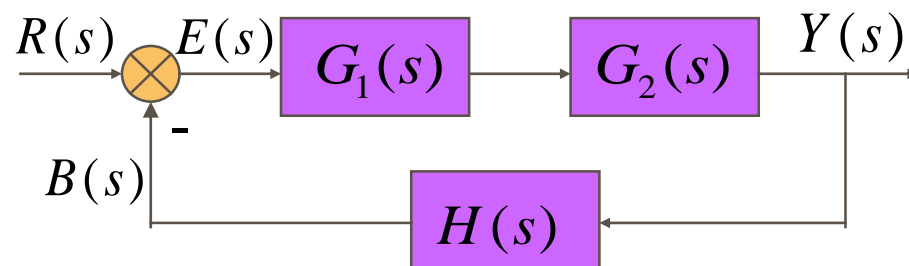$$= \frac{G_1(s)G_2(s)}{1 + G_1(s)G_2(s)H(s)}$$

2．扰动量作用下的闭环传递函数

$$\Phi_n(s) = \frac{Y(s)}{N(s)} = \frac{G_2(s)}{1 + G_1(s)G_2(s)H(s)}$$

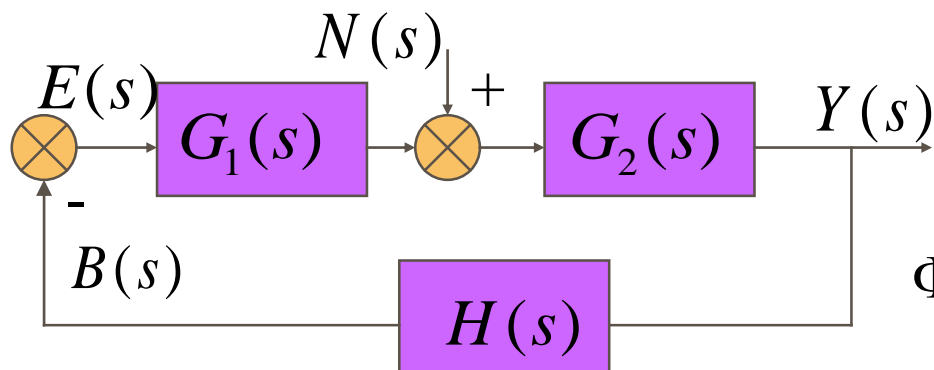$$Y(s) = \Phi(s) \cdot R(s) + \Phi_n(s) \cdot N(s) =$$

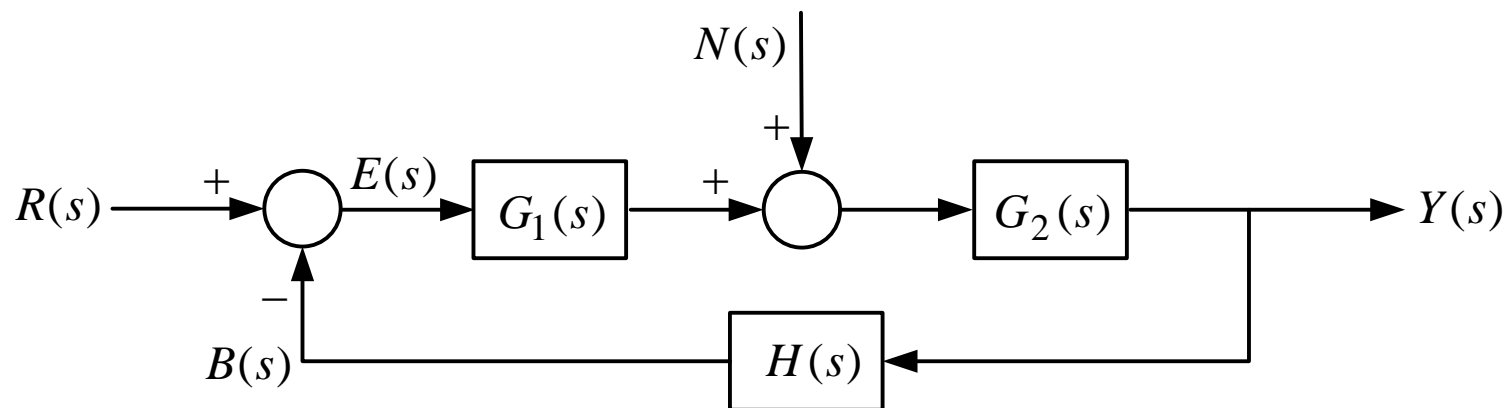$$\frac{1}{1 + G_1(s)G_2(s)H(s)}\left[G_1(s)G_2(s)R(s) + G_2(s)N(s)\right]$$

3．闭环系统的误差传递函数

$$\Phi_e(s) = \frac{E(s)}{R(s)} = \frac{1}{1 + G_1(s)G_2(s)H(s)}$$

$$\Phi_{en}(s) = \frac{E(s)}{N(s)} = \frac{-G_2(s)H(s)}{1 + G_1(s)G_2(s)H(s)}$$

$$\Phi(s) = \frac{Y(s)}{R(s)} = \frac{G_1(s)G_2(s)}{1 + G_1(s)G_2(s)H(s)} \qquad \Phi_n(s) = \frac{Y(s)}{N(s)} = \frac{G_2(s)}{1 + G_1(s)G_2(s)H(s)}$$

$$\Phi_e(s) = \frac{E(s)}{R(s)} = \frac{1}{1 + G_1(s)G_2(s)H(s)} \qquad \Phi_{en}(s) = \frac{E(s)}{N(s)} = \frac{-G_2(s)H(s)}{1 + G_1(s)G_2(s)H(s)}$$

闭环系统的特征方程式： $1 + G_1(s)G_2(s)H(s) = 0$

开环传递函数： $G_1(s)G_2(s)H(s)$