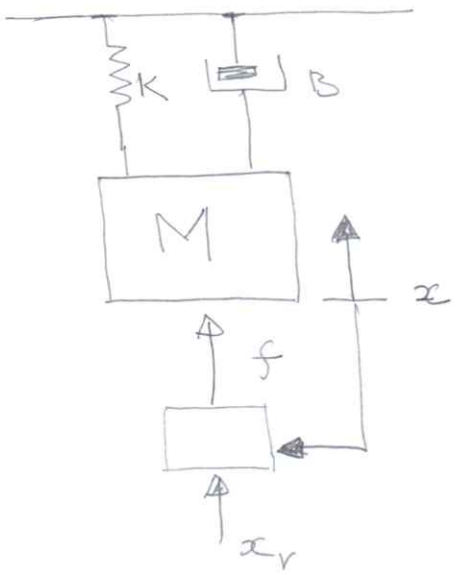
6.




$M = 1\,kg$

$A = 5$

$K = 2\ N/m$

$$F_R = ma.$$

$$M\ddot{x}(t) = f(t) - B\dot{x}(t) - Kx(t)$$

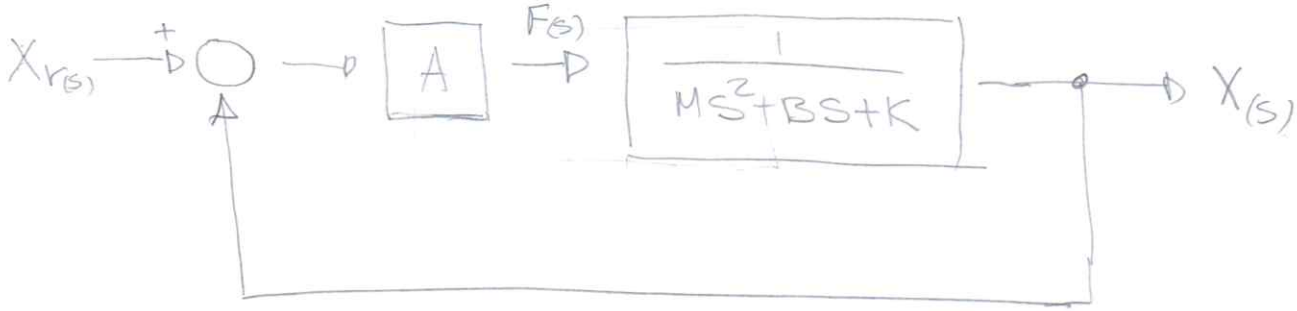
$$\xrightarrow{\mathcal{L}}$$

$$MS^2X(s) = F(s) - BSX(s) - KX(s)$$

$$= F(s) - (BS+K)X(s)$$

$$(MS^2+BS+K)X(s) = F(s)$$

$$\therefore \quad \frac{X(s)}{F(s)} = \frac{1}{MS^2+BS+K} \Rightarrow FTMA$$




$$FTMA = \frac{A}{s^2M+sB+K} = \frac{5}{s^2+sB+2}$$

$$D(s)\big|_{FTMF} = s^2+sB+7 = 0 \iff sB = -s^2-7$$

$$B = -\frac{(s^2+7)}{s}$$

$$\boxed{B \cdot \frac{s}{(s^2+7)} = -1}$$

6.

$D(s) = s^2 + sB + 7 \Leftrightarrow sB + (s^2+7) = \phi$

FTMF

$$\frac{sB}{(s^2+7)} + \frac{(s^2+7)}{(s^2+7)} = \phi$$

$$\frac{sB}{s^2+7} + 1 = \phi$$

↓

LGR

Zeros: $\phi$

Poles: $\pm\sqrt{7}$

etc