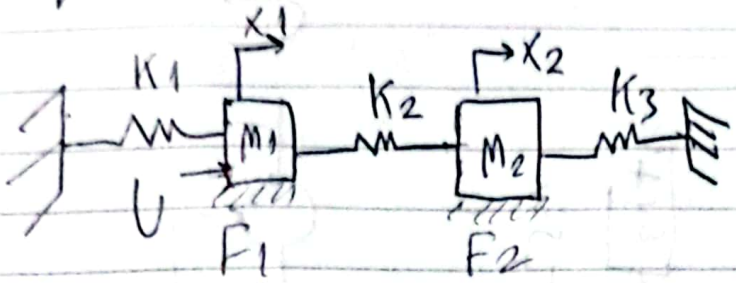
Req 1



M_1

$\rightarrow U$

$\leftarrow K_1 x_1$

$\leftarrow K_2 x_1$

$\leftarrow f_1 \dot{x}_1$

$\rightarrow K_2 x_2$

M_2

$\leftarrow K_2 x_2$

$\rightarrow K_2 x_1$

$\leftarrow K_3 x_2$

$\leftarrow f_2 \dot{x}_2$

Time domain:

$$u(t) - K_1 x_1(t) - K_2 x_1(t) - f_1 \dot{x}_1(t) + K_2 x_2(t) = M_1 \ddot{x}_1(t)$$

$$K_2 x_1(t) - K_2 x_2(t) - K_3 x_2(t) - f_2 \dot{x}_2(t) = M_2 \ddot{x}_2(t)$$

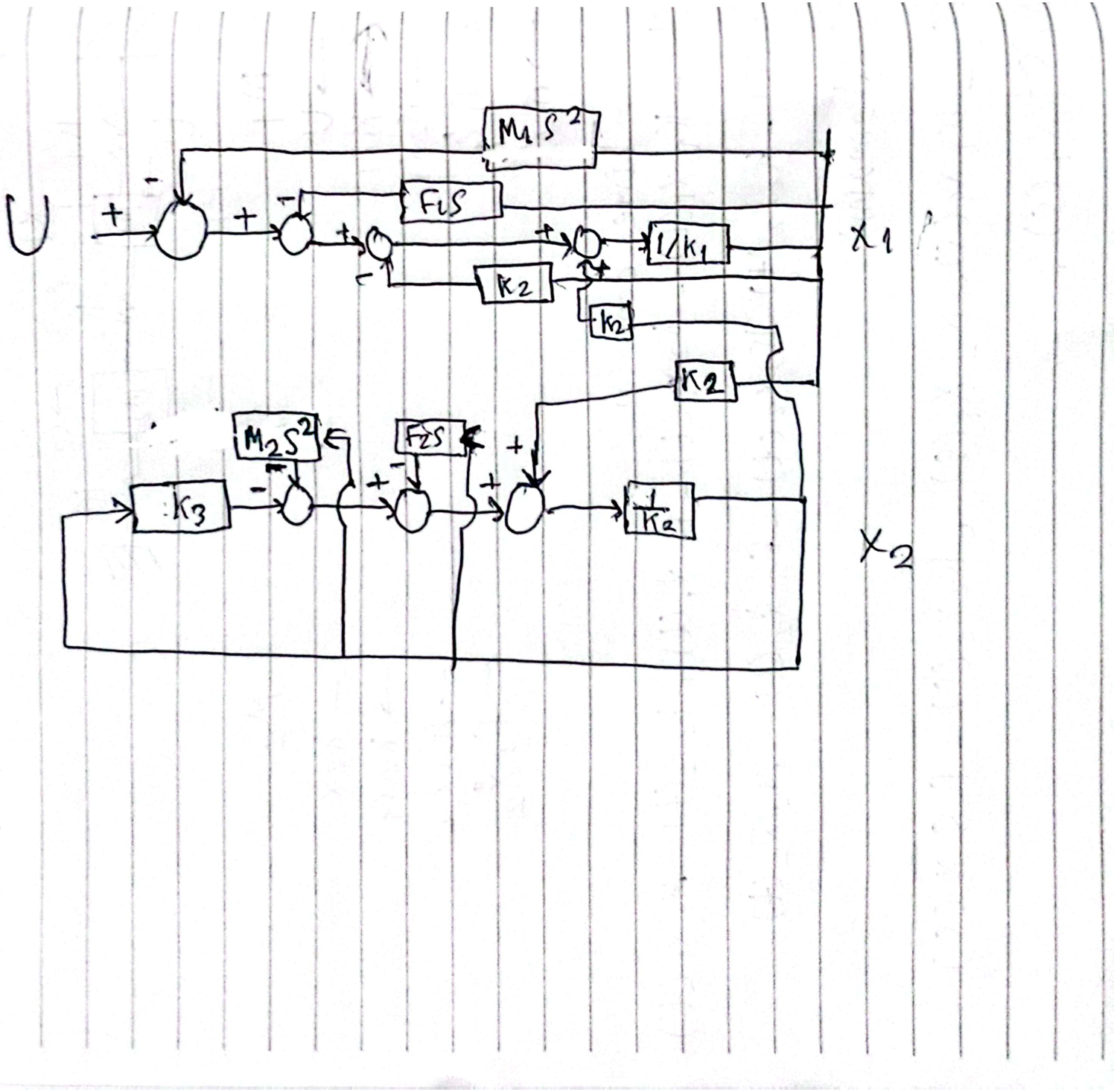
S domain:

$$U(S) - K_1 X_1(S) - K_2 X_1(S) + K_2 X_2(S) - f_1 S X(S) = M_1 S^2 X_1(S).$$

$$K_2 X_1(S) - K_2 X_2(S) - K_3 X_2(S) - F_2 S X_2(S) = M_2 S^2 X_2(S)$$

$$U(S) - X_1(S)[K_1 + K_2 + f_1 + M_1 S^2] + K_2 X_2(S) = 0$$

$$X_2(S)[-K_2 - K_3 - f_2 S - M_2 S^2] + K_2 X_1(S) = 0$$


U
+
-
+
-
+
-
M_1S^2
F_1S
$1/K_1$
K_2
K_2
K_2
x_1
M_2S^2
F_2S
K_3
$\frac{1}{K_2}$
x_2