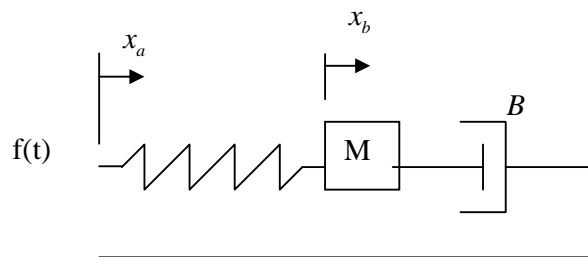


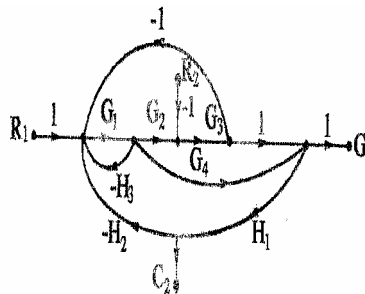
1. Consider mechanical system in Fig1. Suppose this system as a linear system. External force, $f(t)$, is a system input and mass m_2 displacement, x_b , is system output. Mass displacement is measured by comparing with and without external force. Defined state variables as below:

$$\begin{aligned} x_1 &= x_b & u &= f \\ x_2 &= \dot{x}_1 & y &= x_b \end{aligned}$$

- Find system equation.
- Find the state space equations for this system.
- Sketch block diagram for this system.
- Find transfer function for this system whit usage of state space equation.



2. Find the transfer function $C_2(s)/R_2(s)$.



3. Consider block diagram of a control system in Fig 3. Simplify this block diagram.

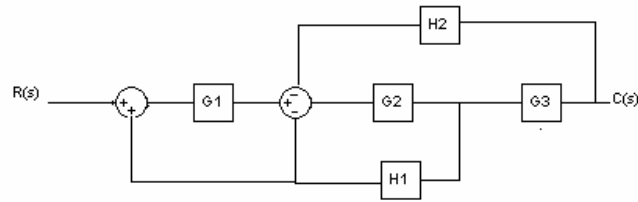


Fig.3

.....
4. Consider block diagram of a control system in Fig 4. Find transfer functions W_m/W_d , W_m/T_d

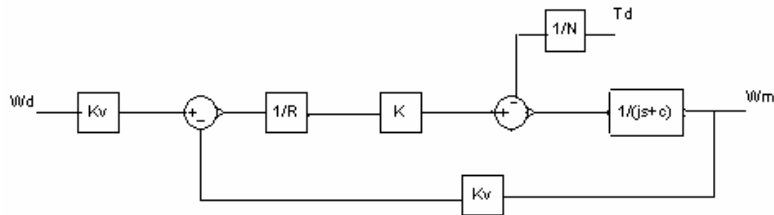


Fig4