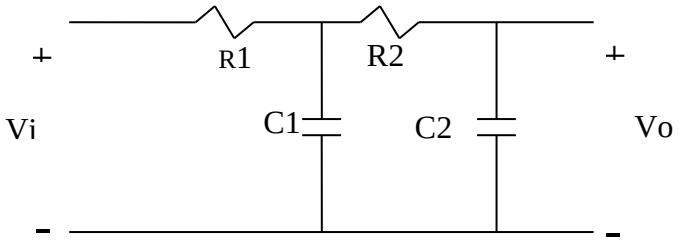
Cairo University
Faculty of Engineering
Computer Dept.

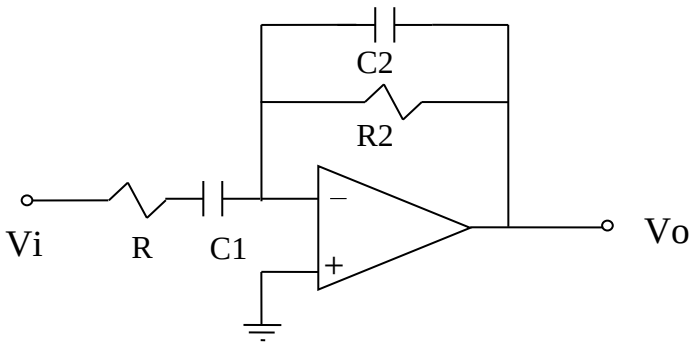
ELC 3252
Control Engineering
3rd year - 2022

Sheet 2
Mathematical Modeling

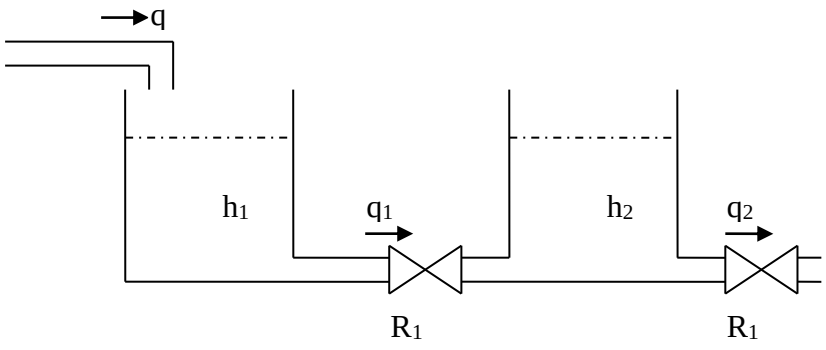
1. **For the circuit shown, obtain the transfer function Vo(s)/Vi(s).**



2. **For the Ideal Op-amp circuit shown, obtain the transfer function Vo(s)/Vi(s)**



3. **The figure shows a process plant containing of two tanks of areas A_1 and A_2. Derive the transfer function that relates q_2 to q.**



4. Derive the differential equations that represent the mechanical system shown, where U is a force that affects the mass M_1 and hence derive the transfer functions $X_1(s)/U(s)$ and $X_2(s)/U(s)$. If the force U has a value of 1 N find the steady state values of X_1 and X_2.