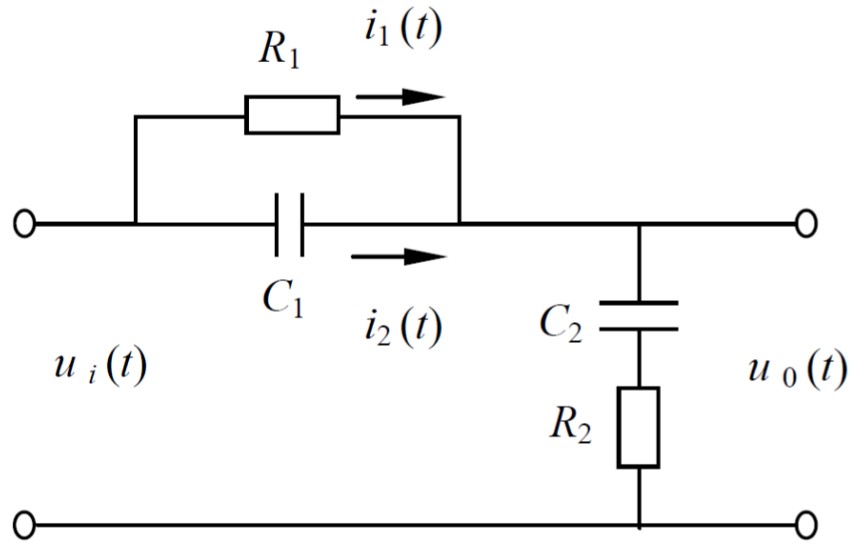


Establish a mathematical model of the system shown in the diagram and express it in the form of transfer function.



Solution:

$$\left\{ \begin{array}{l} u_i(t) = u_o(t) + i_1(t)R_1 \\ \frac{1}{C_1} \int i_2(t) dt = i_1(t)R_1 \\ i(t) = i_1(t) + i_2(t) \\ u_o(t) = i(t)R_2 + \frac{1}{C_2} \int i(t) dt \end{array} \right.$$

$$\left\{ \begin{array}{l} U_i(s) = U_o(s) + I_1(s)R_1 \\ \frac{1}{C_1 s} I_2(s) = I_1(s)R_1 \\ I(s) = I_1(s) + I_2(s) \\ U_o(s) = I(s)R_2 + \frac{1}{C_2 s} I(s) \end{array} \right.$$

$$G(s) = \frac{R_1 R_2 C_1 C_2 s^2 + (R_1 C_1 + R_2 C_2) s + 1}{R_1 R_2 C_1 C_2 s^2 + (R_1 C_2 + R_2 C_2 + R_1 C_1) s + 1}$$