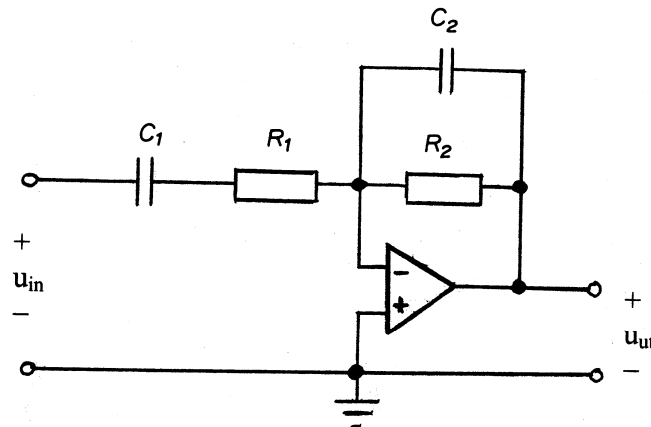


F2.3



$$Z_1 = R_1 + \frac{1}{j\omega C_1} = \frac{j\omega C_1 R_1 + 1}{j\omega C_1}$$

$$Z_2 = \frac{R_2 \cdot \frac{1}{j\omega C_2}}{R_2 + \frac{1}{j\omega C_2}} = \frac{R_2}{j\omega C_2 R_2 + 1}$$

$$\frac{U_{out}}{U_{in}} = - \frac{Z_2}{Z_1} = \frac{- j\omega C_1 R_2}{(j\omega C_2 R_2 + 1) \cdot (j\omega C_1 R_1 + 1)}$$

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$$\frac{U_{out}}{U_{in}} = \frac{- j \frac{\omega}{1000}}{\left(j \frac{\omega}{100000} + 1 \right) \left(j \frac{\omega}{1000} + 1 \right)}$$

$$\left| \frac{U_{out}}{U_{in}} \right| = \frac{\omega}{1000} \cdot \frac{1}{\sqrt{\left(\frac{\omega}{100000}\right)^2 + 1} \cdot \sqrt{\left(\frac{\omega}{1000}\right)^2 + 1}}$$

$$\omega \ll 1000 \rightarrow \left| \frac{U_{out}}{U_{in}} \right| = \frac{\omega}{1000}$$

$$1000 \ll \omega \ll 100000 \rightarrow \left| \frac{U_{out}}{U_{in}} \right| = 1$$

$$\omega \gg 100000 \rightarrow \left| \frac{U_{out}}{U_{in}} \right| = \frac{100000}{\omega}$$

