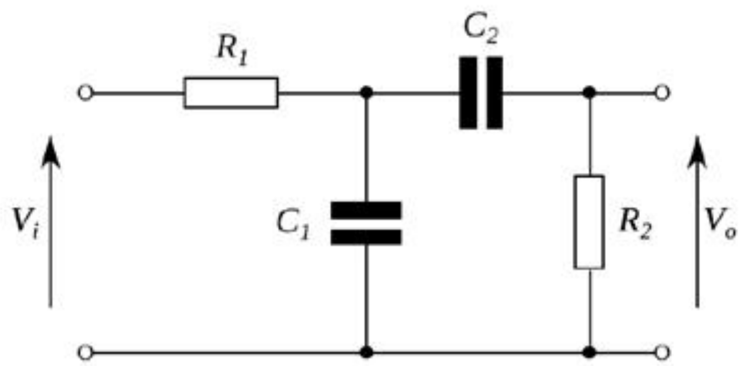
For the circuit shown in Figure 2, show that the transfer function relating output voltage V_o to input voltage V_i is

$$\frac{V_o(s)}{V_i(s)} = \frac{sC_2R_2}{1 + s(C_1R_1 + C_2R_1 + C_2R_2) + s^2C_1C_2R_1R_2}$$



$$Z_1 = \frac{1}{sC_2} + R_2$$

$$Z_2 = \frac{Z_1}{sZ_1C_1 + 1}$$

$$Subbing\ in\ Z_1$$

$$\Rightarrow Z_2 = \frac{\frac{1}{sC_2} + R_2}{sC_1(\frac{1}{sC_2} + R_2) + 1}$$

$$= \frac{sR_2C_2 + 1}{s^2R_2C_1C_2 + s(C_1 + C_2)}$$

$$Z_2\ and\ R_1\ now\ form\ a\ potential\ divider, which\ outputs\ voltage\ V_x$$

$$\Rightarrow V_x = \frac{Z_2}{Z_2 + R_1}V_{in}$$

$$= \frac{\frac{sR_2C_2 + 1}{s^2R_2C_1C_2 + s(C_1 + C_2)}}{\frac{sR_2C_2 + 1}{s^2R_2C_1C_2 + s(C_1 + C_2)} + R_1}V_{in}$$

$$= \frac{sR_2C_2 + 1}{s^2R_1R_2C_1C_2 + s(R_1C_1 \ + R_2C_2 + R_1C_2) + 1} V_{in}$$

$$\Rightarrow \frac{V_x}{V_{in}} = \frac{sR_2C_2 + 1}{s^2R_1R_2C_1C_2 + s(R_1C_1 \ + R_2C_2 + R_1C_2) + 1}$$

$$Let\ this = H_1(s)$$

$$Now\ V_o\ can\ be\ calculated\ as\ a\ franction\ of\ V_x$$

$$V_o = \frac{sR_2C_2}{sR_2C_2 + \ 1} V_x$$

$$\Rightarrow \frac{V_o}{V_x} = \frac{sR_2C_2}{sR_2C_2 + \ 1}$$

$$Let\ this\ equal\ H_2(s)$$

$$\Rightarrow \frac{V_o}{V_{in}} = \frac{V_x}{V_{in}} \times \frac{V_o}{V_x} = H_1(s)H_2(s) = H(s)$$

$$H(s) = \frac{sR_2C_2 + 1}{s^2R_1R_2C_1C_2 + s(R_1C_1 \ + R_2C_2 + R_1C_2) + 1} \times \frac{sR_2C_2}{sR_2C_2 + \ 1}$$

$$= \frac{(sR_2C_2 + 1)(sR_2C_2)}{(s^2R_1R_2C_1C_2 + s(R_1C_1 \ + R_2C_2 + R_1C_2) + 1)(sR_2C_2 + \ 1)}$$

$$= \frac{sR_2C_2}{s^2R_1R_2C_1C_2 + s(R_1C_1 \ + R_2C_2 + R_1C_2) + 1}$$

$$= \frac{sC_2R_2}{1 + s(C_1R_1 \ + C_2R_1 + C_2R_2) + s^2C_1C_2R_1R_2}$$

$$Your\ method\ got\ me\ to\ the\ correct\ answer, after\ alot\ of\ algerbra\ smplifications\ lol, but\ cheers\ man$$