MULTI-STAGE AMPLIFIERS

To analyze multistage amplifier the h-parameters of the transistor used are obtained from manufacture data sheet. The manufacture data sheet usually provides h-parameter in CE configuration. These parameters may be converted into CC and CB values. For example fig. 4 hrc in terms of CE parameter can be obtained as follows.

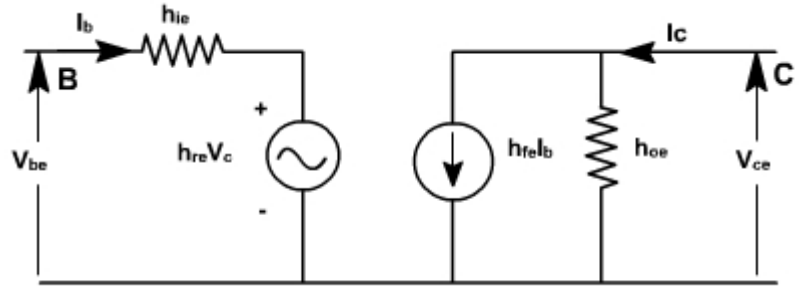

Fig. 4

For CE transistor configuaration

Vbe = hie Ib + hre Vce

Ic = h fe Ib + hoe Vce

The circuit can be redrawn like CC transistor configuration as shown in fig. 5.

Vbc = hie Ib + hrc Vec

Ic = hfe Ib + hoe Vec

$$h_{rc} = \left.\frac{V_{be}}{V_{ec}}\right|_{I_b=0}$$

$$= \left.\frac{V_{be}+V_{ec}}{V_{ec}}\right|_{I_b=0}$$

$$= \left.\left(\frac{V_{be}}{V_{ec}}+1\right)\right|_{I_b=0}$$

Since $I_b = 0$, $V_{be} = h_{re} V_c = -h_{re} V_{ec}$

$$\therefore h_{rc} = 1+\left(\frac{h_{re} V_{ec}}{V_{ec}}\right)$$

$$= 1 - h_{re}$$

Similarly

$$h_{fc} = \left.\frac{I_e}{I_b}\right|_{V_{ec}=0} = \left.\frac{-(I_b+I_C)}{I_b}\right|_{V_{ec}=0}$$

$$= -(1+h_{fe})$$

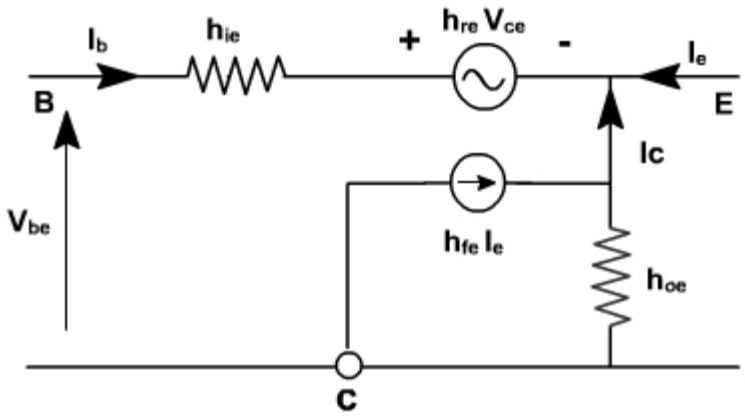

Fig. 5