DETERMINATION OF H - PARAMETERS

To determine the four h-parameters of transister amplifier, input and output characteristic are used. Input characteristic depicts the relationship between input voltage and input current with output voltage as parameter. The output characteristic depicts the relationship between output voltage and output current with input current as parameter. Fig. 5, shows the output characterisitcs of CE amplifier.

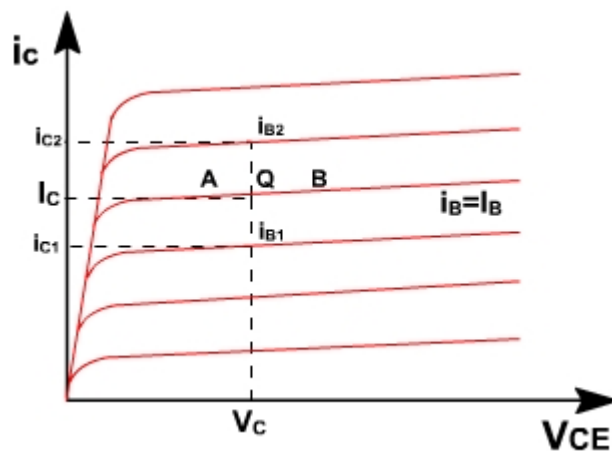$$h_{fe} = \frac{\partial i_C}{\partial i_B}\bigg|_{V_C} = \frac{i_{C2} - i_{C1}}{i_{b2} - i_{b1}}$$

Fig. 5

The current increments are taken around the quiescent point Q which corresponds to iB = IB and to the collector voltage VCE = VC

$$h_{oe} = \frac{\partial i_C}{\partial V_C}\bigg|_{i_B}$$

The value of hoe at the quiescent operating point is given by the slope of the output characteristic at the operating point (i.e. slope of tangent AB).

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$$h_{ie} = \frac{\partial V_B}{\partial i_B} \approx \frac{\Delta V_B}{\Delta i_B}\bigg|_{V_C}$$

hie is the slope of the appropriate input on fig. 6, at the operating point (slope of tangent EF at Q).

$$h_{re} = \frac{\partial V_B}{\partial V_C} = \frac{\Delta V_B}{\Delta V_C}\bigg|_{I_B} = \frac{V_{B2} - V_{B1}}{V_{C2} - V_{C1}}$$
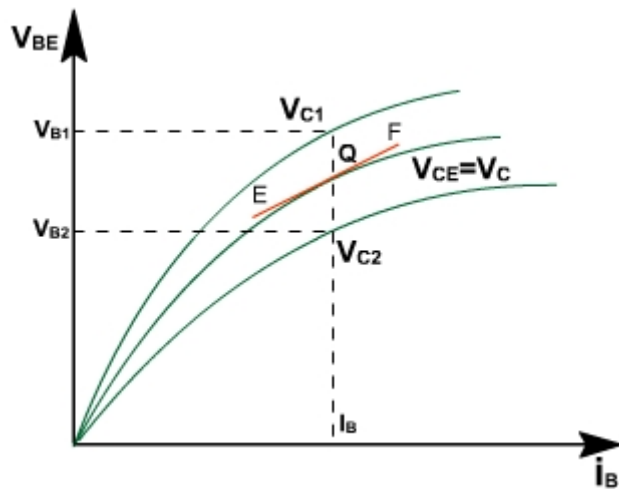

Fig. 6

A vertical line on the input characteristic represents constant base current. The parameter hre can be obtained from the ratio (VB2– V B1) and (VC2– V C1) for at Q.

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