

$$\frac{i}{V_s} = \frac{\beta i}{V_s} = \alpha \left(\frac{R_{\text{in}}}{R_{\text{in}} + r_o} \right) \left(\frac{1}{R_s + R_{\text{in}} \parallel r_o} \right)$$

↑
 fraction of
 current in
 R_{in} that
 is i

↑
 V_s times
 this is the
 current
 in R_s