$$I_C(I_B, V_{CE})$$
$$V_{CE}$$
$$I_B$$
$$V_{BE}$$
$$I_C(V_{BE}, V_{CE})$$

$$-W_E - x_{BE}$$
$$-x_{BE}$$
$$0$$
$$W_B$$
$$W_B + x_{BC}$$
$$x$$
$$p_{nC}(x)$$
$$n_{pB}(x)$$
$$p_n E(x)$$

$$B$$
$$I_B$$
$$I_R$$
$$\alpha_F I_F$$
$$I_C$$
$$C$$
$$I_F$$
$$\alpha_R I_R$$
$$E$$
$$I_E$$

$$I_C = \beta I_B$$
$$V_{BE} = 0.7\text{V}$$
$$V_{CE} = 0.1\text{V}$$
$$\mu\text{A}$$

(V)

$I_B = 100\text{nA}$
$I_B = 200\text{nA}$
$I_B = 300\text{nA}$
$I_B = 400\text{nA}$
$I_B = 500\text{nA}$
$I_B = -1\text{mA}$
$V_{BE} = 600\text{mV}$
$V_{BE} = 610\text{mV}$
$V_{BE} = 620\text{mV}$
$V_{BE} = 630\text{mV}$
$V_{BE} = 640\text{mV}$