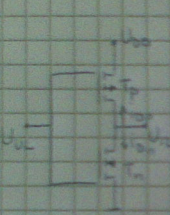
Priprema za 1. laboratorijsku vježbu

25.3.2010. (16h, A304)

1.



$L_n = L_p = 0.2\mu m$ $K_n' = 228\mu A/V^2$ $U_{DSZASn} = 0.45V$

$W_n = 0.3\mu m$ $K_p' = -66\mu A/V^2$ $U_{DSZASp} = -0.6V$

$U_{DD} = 1.8V$ $U_{GSOn} = -U_{GSOp} = 0.45V$

$U_{PO} = ?$ a) $W_p/W_n = 1$, b) $W_p/W_n = 3$, c) $W_p/W_n = 5$

$U_{PO} \Rightarrow U_{On} = U_{IZ}$

$I_{Dn} = -I_{DP}$

$U_{GSn} = U_{PO} \rightarrow U_{GSp} = U_{PO} - U_{DD}$

$K_n\left(U_{PO} - U_{GSOn} - \frac{U_{DSZASn}}{2}\right)U_{DSZASn} = -K_p\left(U_{PO} - U_{DD} - U_{GSOp} - \frac{U_{DSZASp}}{2}\right)U_{DSZASp}$

pokratiti $r = \frac{K_p U_{DSZASP}}{K_n U_{DSZASn}} = \frac{(W/L)_p K_p' U_{DSZASP}}{(W/L)_n K_n' U_{DSZASn}} = \frac{W_p}{W_n} \cdot \frac{K_p'}{K_n'} \cdot \frac{U_{DSZASp}}{U_{DSZASn}} \Rightarrow$

a) $r = 1 \cdot 0.2894 \cdot 1.33 = 0.385$

$I_{Dn} = -I_{Dp}$

$U_{GSn} = U_{PO} \rightarrow U_{GSp} = U_{PO} - U_{DD}$

$K_n \left(U_{PO} - U_{GSn} - \frac{U_{DS1ASn}}{2}\right) U_{DS1ASn} = -K_p \left(U_{PO} - U_{DD} - U_{\dots}\right.$

pokratka $r = \frac{K_p U_{DS1ASp}}{K_n U_{DS1ASn}} = \frac{(W/L)_p K_p' U_{DS1ASp}}{(W/L)_n K_n' U_{DS1ASn}} = \frac{W_p}{W_n} = \dots$

a) $r = 1 \cdot 0.2894 \cdot 1.33 = 0.385$

b) $r = 3 \cdot 0.2894 \cdot 1.33 = 1.157$

c) $r = 5 \cdot 0.2894 \cdot 1.33 = 1.192$

$U_{PO} = \frac{\left(U_{GSnP} + \frac{U_{DS1ASn}}{2}\right) + r\left(U_{DD} + U_{GSnP} + \frac{U_{DS1ASp}}{2}\right)}{1+r}$

a) $U_{PO} = 0.779\,V$

b) $U_{PO} = 0.876\,V$

c) $U_{PO} = 0.878\,V$