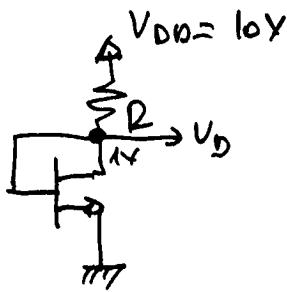


u-MOS enhancement.

$$I_D = 0,4 \text{ mA} \quad V_t = 2 \text{ V} \quad k = 0,4 \frac{\text{mA}}{\text{V}^2}$$



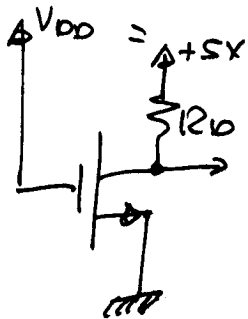
$$V_{GS} = 0$$

$$0,4 = k(V_{GS} - 2)^2$$

$$0,4 = 0,4(V_{GS} - 2)^2 \Rightarrow V_{GS} = 2 \text{ V} = V_D$$

$$R_D = \frac{9 \text{ V}}{0,4 \text{ mA}} \sim 18 \text{ k}\Omega$$

$$V_{DS} = V_{GS} \text{ Limit saturation}$$



$$V_D = 0,1 \text{ V}$$

$$V_t = 1 \text{ V}$$

$$k = 0,5 \frac{\text{mA}}{\text{V}^2}$$

$$\Rightarrow V_{GS} = 5 \text{ V}$$

$$V_{DS} < (V_{GS} - V_t) \\ \hookrightarrow 4 \text{ V}$$

$\Rightarrow$ opera in regione triodo

$$I_D = 0,5 [2(5 - 1) \cdot 0,1 - 0,1] = 0,395 \text{ mA}$$

$$R_D = \frac{5 - 0,1}{0,395} = 12,4 \text{ k}\Omega$$

$$r_{DS} = \frac{V_{DS}}{I_D} = \frac{0,1 \text{ V}}{0,395} = 253 \Omega$$