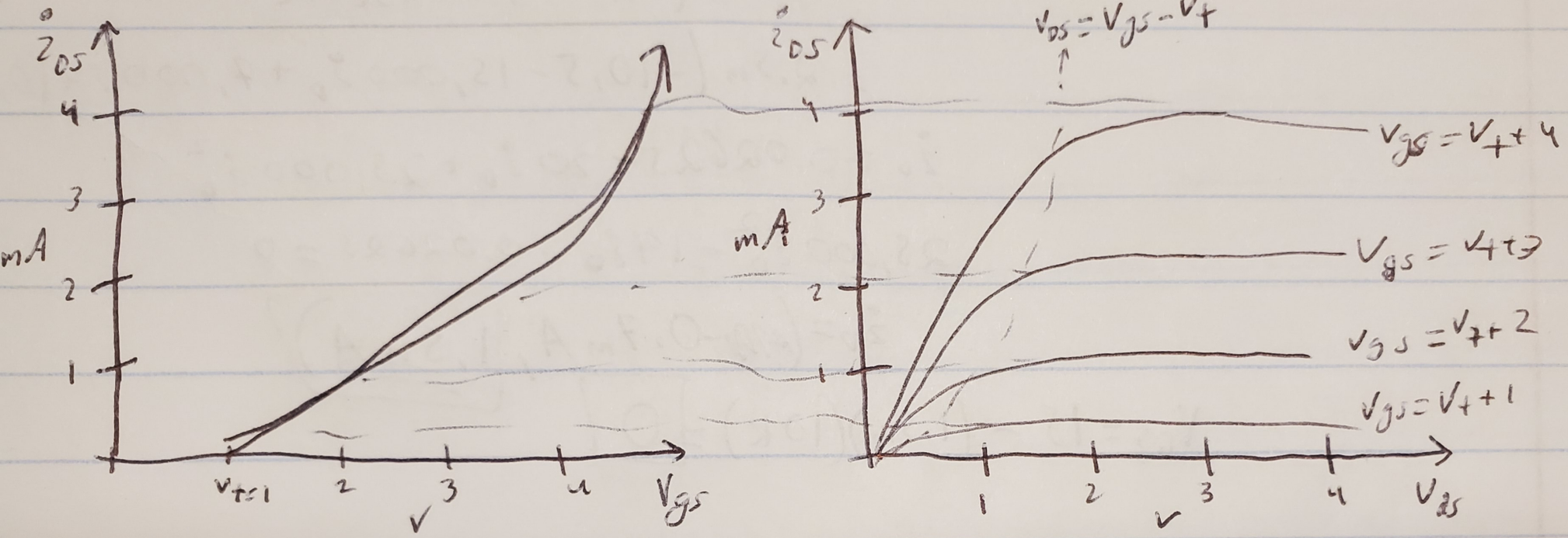
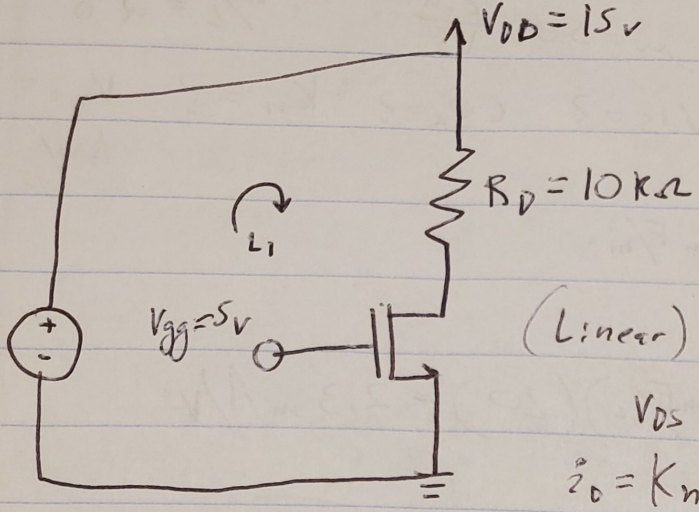


Depletion will open the circuit between drain and source when the gate voltage exceeds the threshold voltage.

Enhancement will close the circuit between drain and source when the gate voltage exceeds the threshold voltage.



$V_t = 1v$

$K_n = 0.5mA/V^2$

$15 - i_D R_D - V_{DS} = 0$

(Linear) $i_D = K_n\left(V_{gs} - V_t - \frac{V_{DS}}{2}\right) \cdot V_{DS}$

$V_{DS} = 15 - i_D R_D$

$i_D = K_n\left(V_{gs} - V_t - \frac{(15 - i_D R_D)}{2}\right)(15 - i_D R_D)$

$= 0.5m\left(4 - 7.5 - \frac{i_D R_D}{2}\right)(15 - i_D R_D)$

$= 0.5m(-3.5 - 5{,}000 i_D)(15 - 10{,}000 i_D)$

$= 0.5m(-3.5 - 5{,}000 i_D)(5)(3 - 2{,}000 i_D)$

$= 2.5m(-10.5 - 15{,}000 i_D + 7{,}000 i_D + 10{,}000{,}000 i_D^2)$

$i_D = 0.02625 - 20 i_D + 25{,}000 i_D^2$

$25{,}000 i_D^2 - 19 i_D - 0.02625 = 0$

$i_D = (-0.7mA, \boxed{1.5mA})$

$V_{DS} = 15 - (1.5m)(10k) = \boxed{0}$

(Saturation) $i_D = \frac{K_n}{2}(V_{gs} - V_t)^2$

$= 0.25m(4)^2$

$= 4mA$

$V_{DS} = 15 - (4m)(10k) = -25v$ X