



*Submitted by :*

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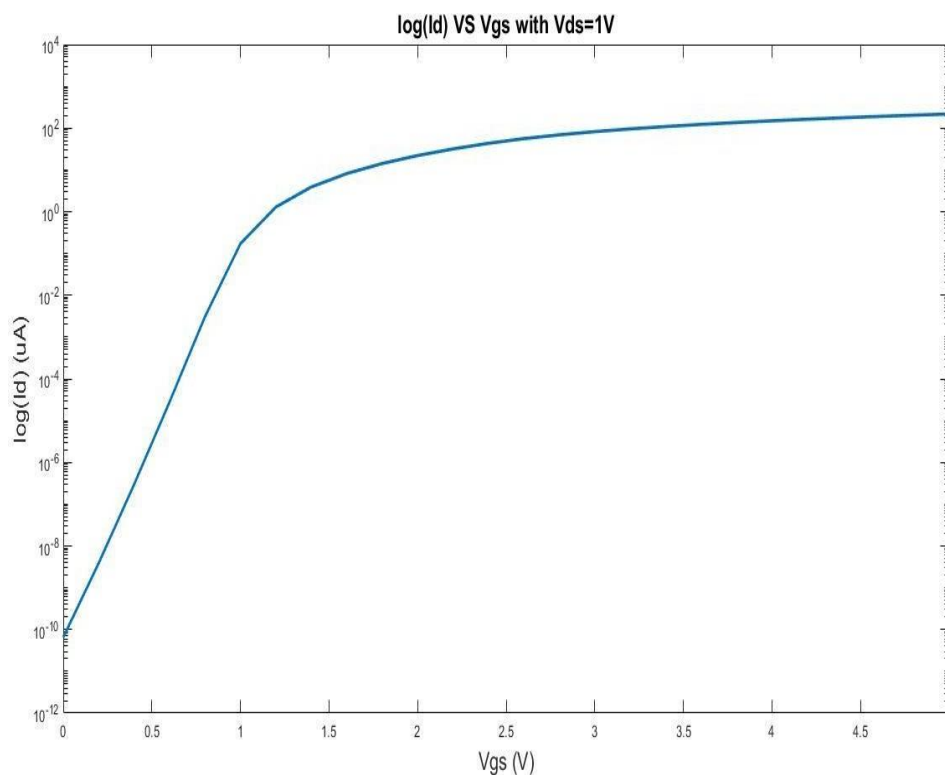
**(Self Project)**

**PROBLEM STATEMENT** : Numerically solve the Pao-Sah and Brews models for the following NMOSFET:  $L = 1\mu\text{m}$ ,  $T_{\text{ox}} = 10\text{nm}$ , n+ poly-Si gate, choose  $N_A$  for target  $V_T$  of  $0.8\text{V}$ , range of  $V_G$  and  $V_D$  sweeps is  $0 - 5\text{V}$ . Plot transfer ( $I_D - V_G$ ) characteristics for different  $V_D$  values and output ( $I_D - V_D$ ) characteristics for different  $V_G > V_T$  values.

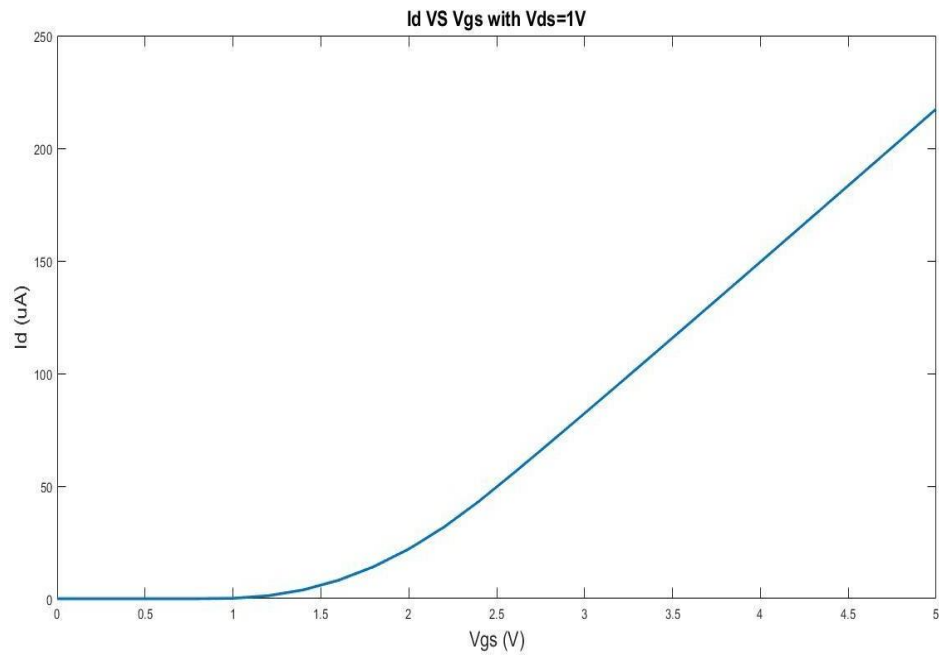
### **ANSWER : PAO SAH**

Firstly I have plotted individual graphs and then with different values of  $V_d$  and  $V_g$

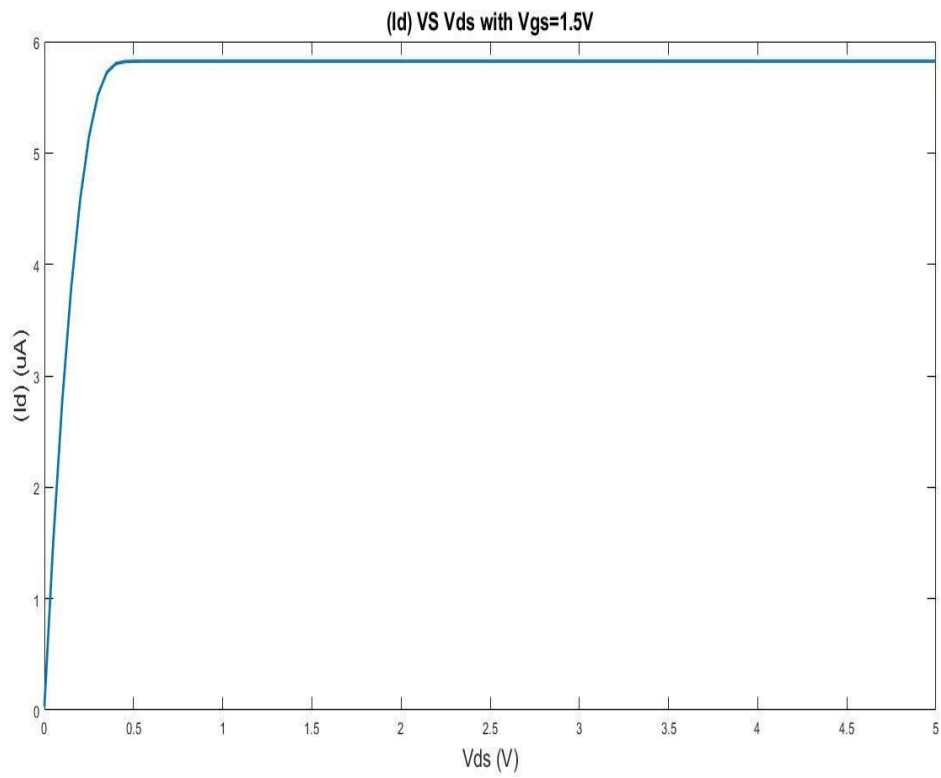
### **$I_d$ VS $V_{gs}(\text{log scale})$**



## Id VS Vgs (linear scale)

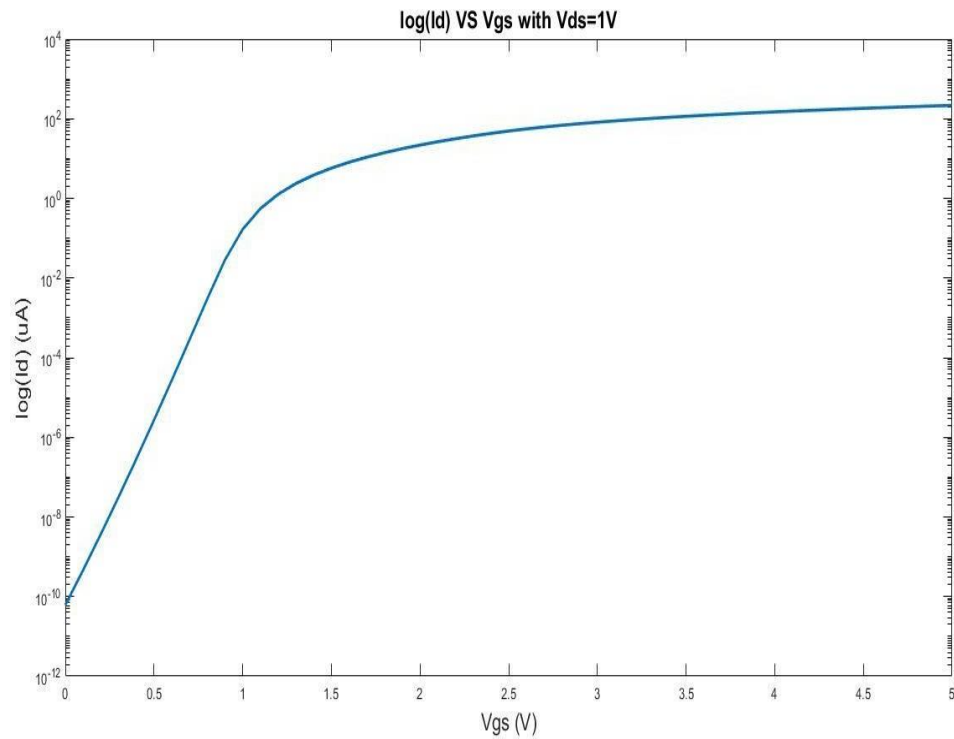


## Id VS Vds (log scale)

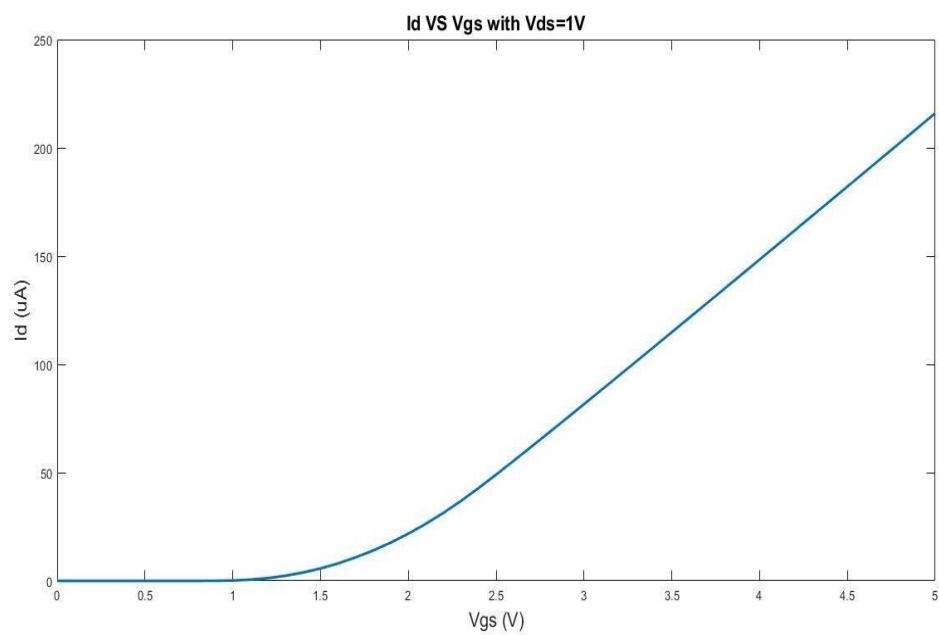


# **BREWS**

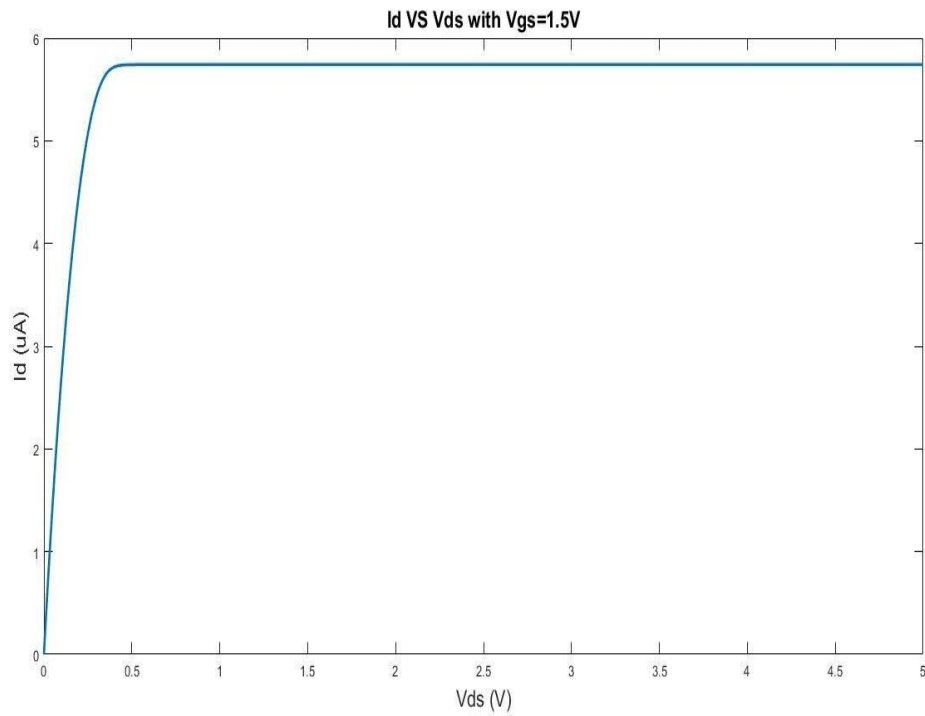
## **Id VS Vgs (log scale)**



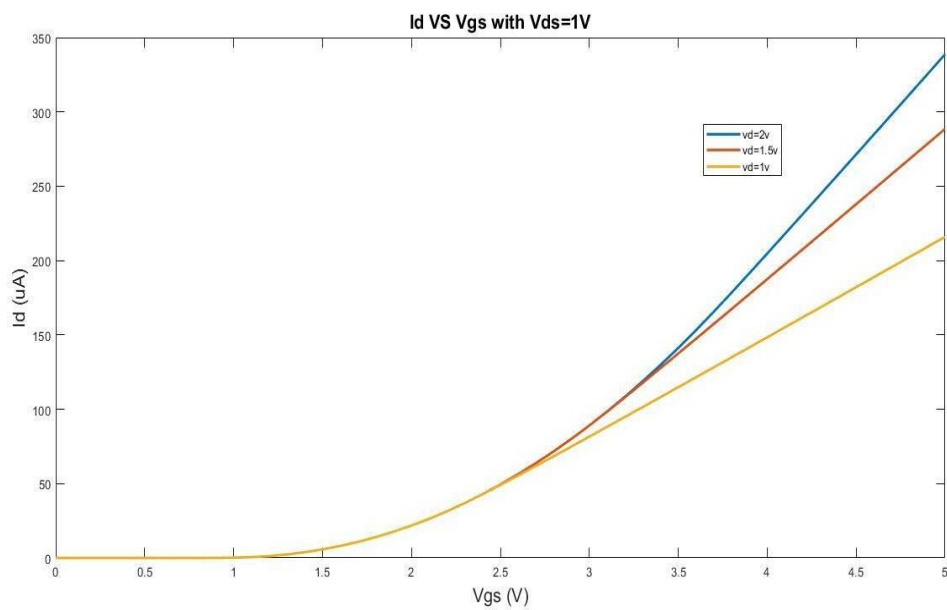
## **Id VS Vgs (linear scale)**

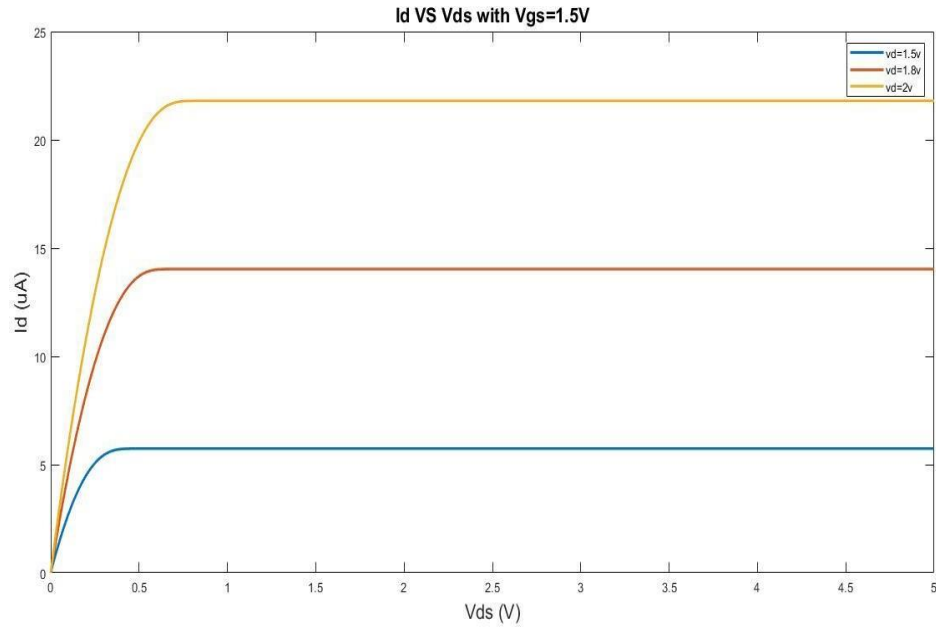


## Id VS Vds

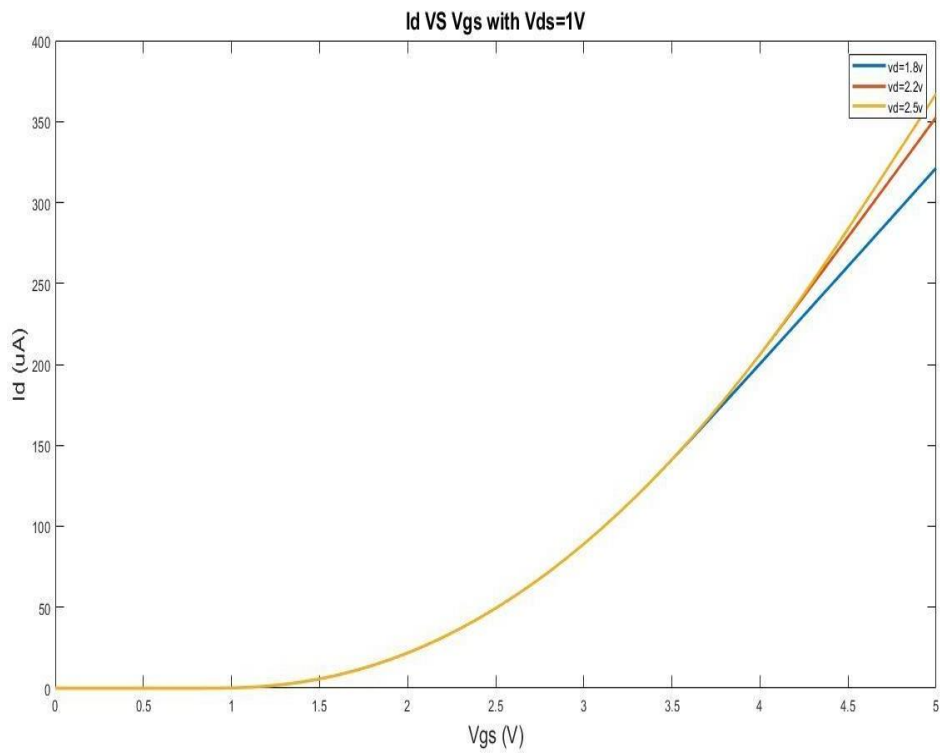


Below are the graphs of **ID-VG** and **ID-VD** for different values for **VD** and **VG** using Pao Sah respectively

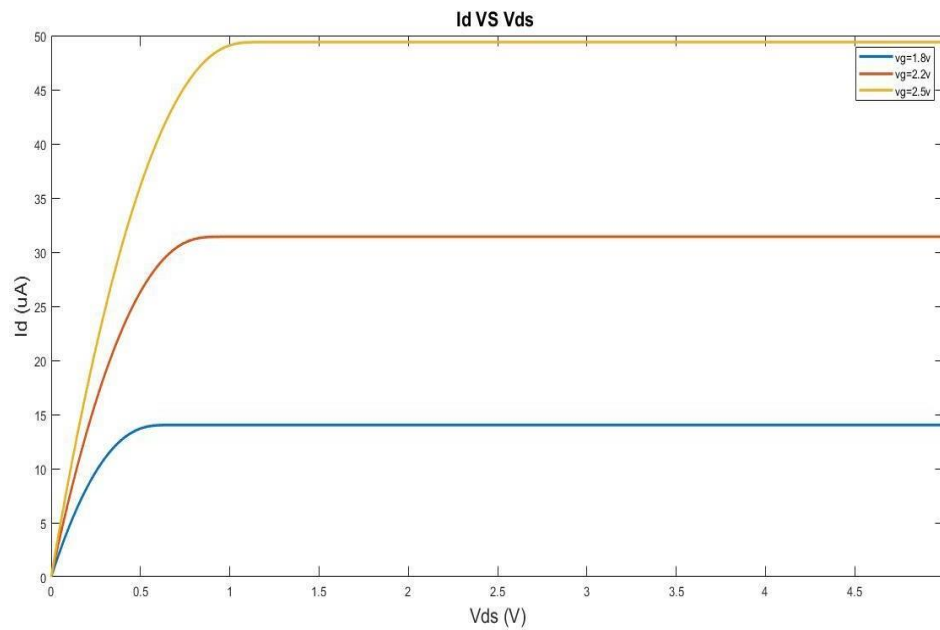




Below are the **graphs of ID-VG and ID-VD for different values for VD and VG using Pao Sah respectively**

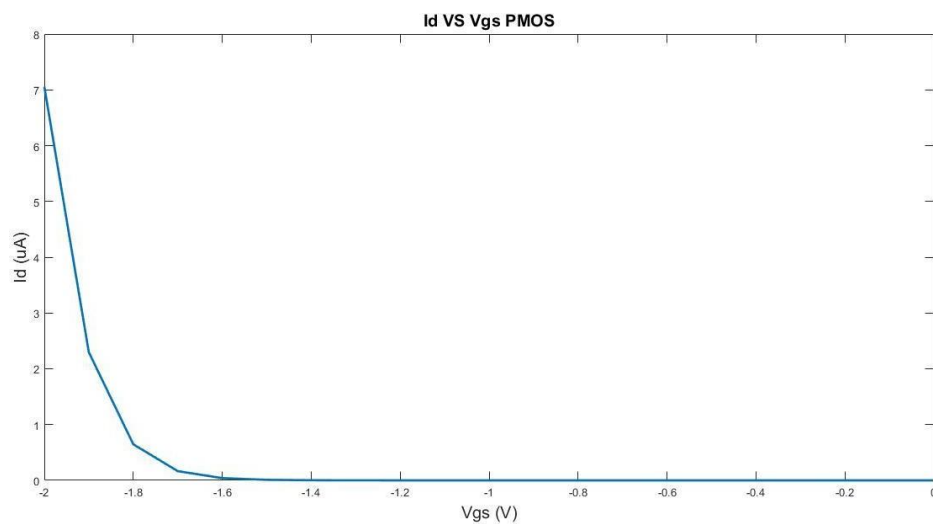


## ID-VD



Similarly, we can get the curves for **PMOS** also

Below I have given the pao-sah model IG-VG curve



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The reason for the sluggish nature of the graph is that the step size is chosen larger (as it takes less time to simulate)

Using the same code we can get the other PMOS codes also