**R.Borumandi 9431023**

**Plot current-voltage Drain formula for approximately and accurately.**

**s.yang Microelectronic Device page 245 equation 9-36&9-37**

%Plot current-voltage Drain formula for approximately and accurately.

% s.yang Microelectronic Device page 245 equation 9-36&9-37

%define typical constant

K=2\*10^-5;

syms VD;

q=1.6\*10^-19;

Ks=11.68\*8.85\*10^-12;

Ee0=8.85\*10^-12;

VG=4;

FiMs=4.25\*q;

FiSi=4.6\*q;

C0=2.9\*10^-4;

VD=0:.1:4;

Na=10^17;

VT=.7;

Q0=(2\*q\*Ks\*Ee0\*Na\*FiSi)^.5;

%define equations

ID=K\*((VG-VT)\*VD-.5\*(VD).^2);

IDeff=K\*((VG-FiMs-FiSi+(Q0/C0)-VD/2).\*VD-2/3\*((2\*q\*Ks\*Ee0\*Na).^.5/C0)\*((VD+FiSi).^1.5-(FiSi).^1.5));

%plot

plot(VD,ID,VD,IDeff,'--');

title('ID & IDeff(--)')

xlabel('VD ');

ylabel('ID ');

****