

Microelectronic Circuits

8th Edition

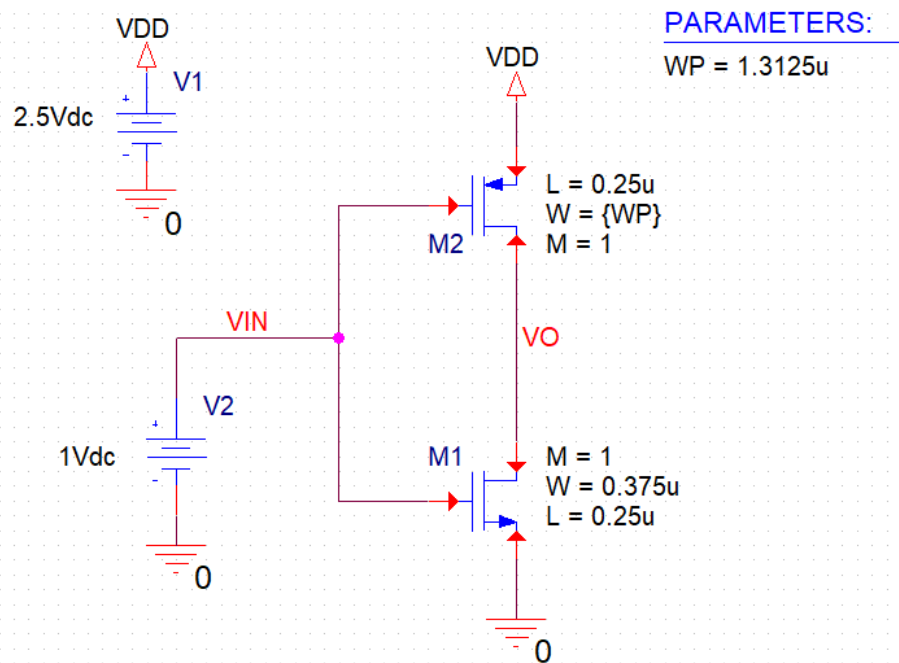
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Spice Problems Solutions
Chapter 16

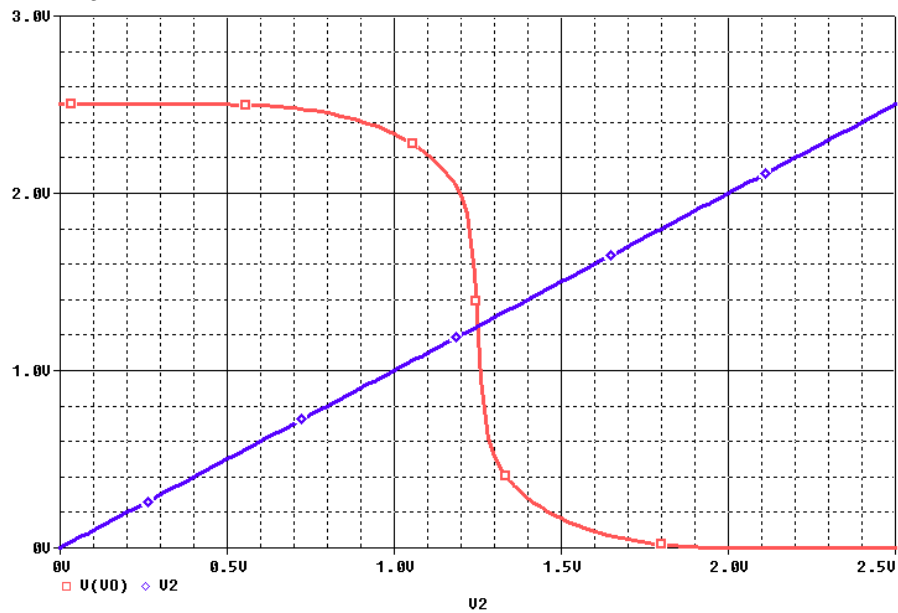
Prepared by: Nijwm Wary
2019

Problem: 16.29

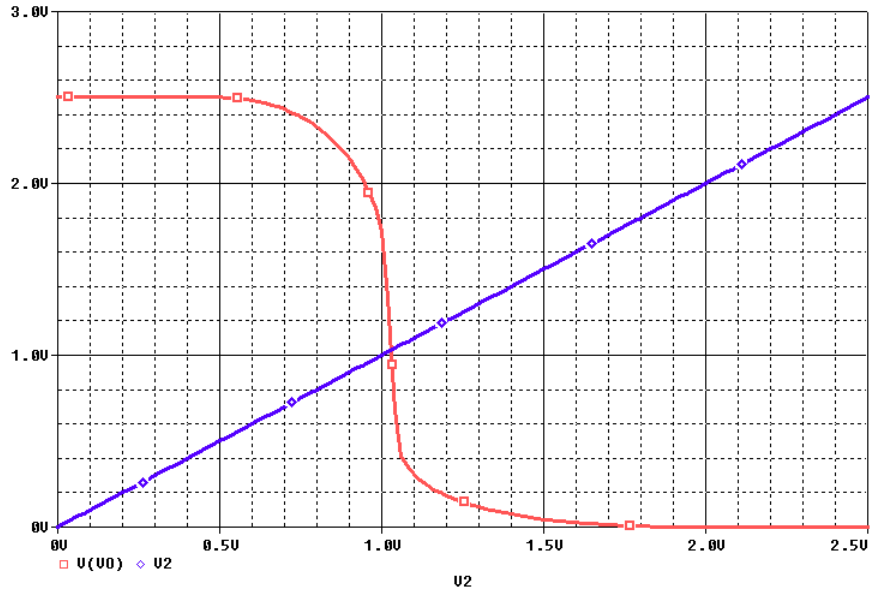
1. The schematics for this problem is shown below



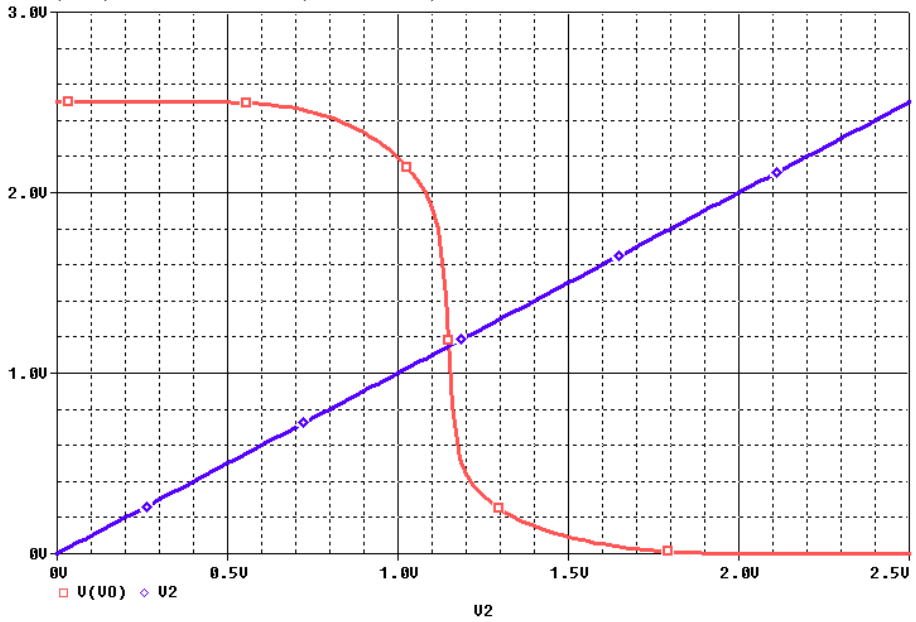
2. Run the netlist to perform a DC sweep. Plot V(VO) and V2 for WP=1.3123u (WP=3.5WN). In this case, $V_M=1.25V$.



3. Next, plot V(VO) for WP=0.375u (WP=WN). In this case, $V_M=1.03V$.



4. Finally, plot $V(VO)$ for $WP=0.75u$ ($WP=2WN$). In this case, $V_M=1.15V$.



Netlist:

Copy the netlist given below and paste it into a text file and save it with *.cir extension.

```

*****Problem: P16_29 *****
***** Main circuit begins here*****
M1      VO VIN 0 0 NMOS0P25
+ L=0.25u
+ W=0.375u
+ M=1
M2      VO VIN VDD VDD PMOS0P25
+ L=0.25u
+ W={WP}
+ M=1
V1      VDD 0 2.5Vdc
V2      VIN 0 1Vdc
.PARAM  wp=1.3125u
***** Main circuit ends here*****

***** PMOS model begins here *****
.model PMOS0P25      PMOS(Level=1 VTO=-0.5 GAMMA=0.5 PHI=0.8
+                    LD=0 WD=0 UO=200 LAMBDA=0.1 TOX=6E-9 PB=0.9)
***** PMOS model ends here *****

***** NMOS model begins here *****
.model NMOS0P25      NMOS(Level=1 VTO=0.5 GAMMA=0.5 PHI=0.8
+                    LD=0 WD=0 UO=700 LAMBDA=0.1 TOX=6E-9 PB=0.9)
***** NMOS model ends here *****

***** Analysis begins here*****
.DC [LIN] V2 0 2.5 0.02
.PROBE
.END
***** Analysis ends here*****

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