Tutorial 2

Saturday, August 13, 2022 1:52 PM

NGSPICE :-

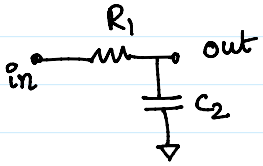
- Netlist ⇒ interconnection of elements.
- Model Files ⇒ Describe the physical behavior of active elements.
  (.include TSMC_180nm.txt , UMC 180nm, IBM 180nm etc).
  TSMC_180nm.txt → Nmos / Pmos
- DC, AC, transient, noise etc.

How to write a Netlist ?

1) Heading.

2) include files .include TSMC_180nm

3) Ckt description



→ Capacitors
  ↳ C1 a b 1pF

→ Resistor
  ↳ R1 a b 1kΩ

→ Voltage sources.
  V1 in gnd

* sine → sin (0 25mV 1kz 0 0 0)
  - 0 → DC offset
  - 25mV → amplitude
  - 1kz → freq.
  - 0 → delay
  - 0 → damping factor
  - 0 → phase

* AC → ac 1

* pulse → pulse (V1 V2 delay rise fall on period time period)
  - V1 → highest voltage
  - V2 → lowest voltage

highest voltage lowest voltage

M1 Drain Gate Source Body Model W={ } L={ }
+ AS={ } PS={ } AD={ } PD={ }

Parasitic capacitances ⇒ → Perimeter Cjsw
→ Area Cj

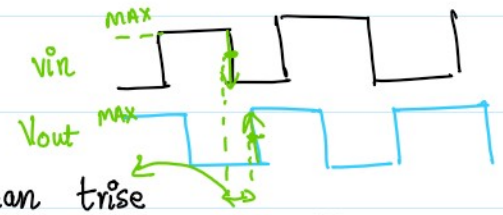
* subckt

4) Analysis

init. final. step.

* .dc Vin 0 1 0.1

* .tran 0.1u 60u → .measure tran trise
+TRIG V(in) VAL= "MAX/2" FALL=1
+TARG V(out) VAL= "MAX/2" RISE=1



* .ac dec 10 10K 10MEG
oct " " "
lin " " "

5) Control commands

.control
run
plot V(in) V(out) - - - -
plot dB(-V(out)/V(in))
↓
(log)

.endc