

Develop an engine or tool in TCL/PERL/Python or any scripting/programming tool to measure power for any cmos circuit

Basic Steps to calculate power

NGSPICE code to find average power of inverter

```
.include NMOS-180nm.lib
```

```
.include PMOS-180nm.lib
```

```
VDD 1 0 1.8 V
```

```
VD 1 2 0
```

```
M1 3 4 2 2 pfet w=6u l=1u
```

```
M2 3 4 0 0 nfet w=3u l=1u
```

```
Vi 3 0 pulse( 0 1.8 1ps 20ps 20ps 1ns 2ns)
```

```
F1 0 5 VD 9
```

```
C1 5 0 10nf
```

```
R1 5 0 100k
```

```
.tran 5ps 4ns
```

```
.control
```

```
run
```

```
plot v(5)
```

```
.endc
```

```
.end
```

This code gives average power of inverter. Voltage across node 5 at 2ns is average power.

For explanation refer CMOS Digital integrated Circuits by Sung Mo Kang and Yusuf Leblebici

Page 265 3rd edition

NGSpice code to calculate leakage power

NGSPICE code to find leakage power of inverter

```
.include NMOS-180nm.lib
```

```
.include PMOS-180nm.lib
```

```
VDD 1 0 1.8 V
```

```
VD 1 2 0
```

```
M1 3 4 2 2 pfet w=6u l=1u
```

```
M2 3 4 0 0 nfet w=3u l=1u
```

```
Vi 3 4 0
```

```
.op
```

```
.control
```

```
run
```

```
Print I(VD)*V(1)
```

```
.endc
```

```
.end
```