

# IEEE @ IIT Presents

## Circuit Design Seminar

### Part 1 of 3: PSpice Tutorial

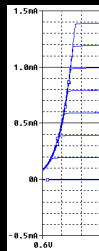
## What is PSpice?

- PSpice is a software tool that performs circuit analysis.
- PSpice does not replace the engineer.
- Racing analogy: a good team needs a good driver and a good car.



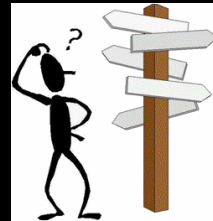
## What can it do?

- User can enter circuits through netlists or schematics.
- Debug circuits, test designs, perform other analysis:
  - DC bias point detail.
  - AC / DC sweeps.
  - Transient analysis.



## What can it do for you?

- Verify your homework solutions.
- Used in your lab experiments.
- Hobbyist work or projects.



## Input Methods

- Netlists:
  - Text input method.
  - Practical for smaller circuits.
- Schematics:
  - Graphical input method.
  - Better suited for larger circuits, complex components.
- In both cases, the final circuit is modeled as mathematical approximations.

## Netlists

- First line must contain a comment.
- Component format:  
(component)(number) (node1) (node2) (value)
  - \* Sources and semiconductors are different.
- Components:
  - Passive: R, L, C.
  - Sources: V, I – AC, DC, or SIN.
  - Controlled Sources: E, F, G, H. (Ex: op-amps) (VCVS, ICIS, VCIS, ICVS)
- Node 0 is ground!

## Netlist Example

Remember: (component)(number) (node1) (node2) (value)

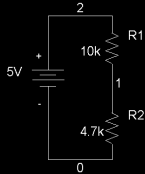
File `test1.cir`:

// Sample netlist for a voltage divider

```
V1 2 0 DC 5V
```

```
R1 2 1 10k
```

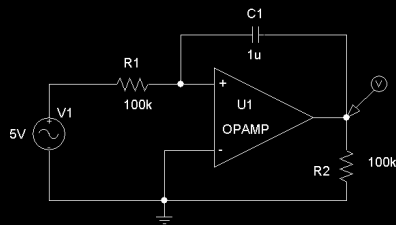
```
R2 1 0 4.7k
```



## Schematics

- Graphical input method.
- Easier to manage large circuits.
  - Or those with lots of semiconductors.
- Remember to place a ground!
  - EGND, GND\_ANALOG, or GND\_EARTH

## Schematics Example



## Analysis Types

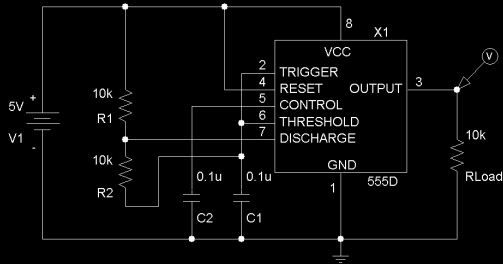
- Bias point calculation (DC)
- AC sweep, DC sweep, transient analysis
- Netlists:
  - .TRAN, .DC, .AC
  - .PROBE
  - .END
- Schematics, of course, is point and click.

## Examples

- DC bias point
- AC sweep
- DC sweep
- Transient

## Questions?

## Main Example



## What's next?

Coming up: Everything relating to PCBs (Printed Circuit Boards), component types, and production steps.

Design considerations, trace layout, and EMI will be discussed.

Thanks for coming!