

Using Spice for KCL Analysis

Figure ?? is a circuit analyzed by hand earlier. We shall now create a Spice netlist for this circuit and simulate it.

Figure 1: KVL Spice problem.

The Spice netlist for the circuit above is placed in a normal text file with whatever editor you like. It looks like this:

```
.title class example problem (kcl)
**** netlist follows ****
v1      z      gnd      10
r1      y      z        5
r2      gnd    y        10
r3      y      x        10
r4      gnd    x        10
i1      x      y        2
**** netlist done ****
.control
    set numdgt=2
    op
    echo Node voltages:
    print line v(x) v(y) v(z)
    echo
    show v1
    quit
.endc
.end
```

The body of the netlist is shown below. A review of its format is given below. Note that nodes V_x , V_y , and V_z have been abbreviated x , y and z respectively.

```
type of element and its reference designation
r = resistor
v = voltage source
i = current source
|
|      node to which the positive terminal of element is connected
|      |
|      |      node to which the negative terminal of element is connected
|      |      |
|      |      |      value of the element
|      |      |      |
v1     z      gnd    10
r1     y      z      5
r2     gnd    y      10
r3     y      x      10
r4     gnd    x      10
i1     x      y      2
```

Spice is invoked on the file `kc11.sp` at the Unix prompt by typing:

```
ngspice kc11.sp > output
```

The results from the simulation are in the file *output*.

```
Circuit: class example problem (kcl)

Doing analysis at TEMP = 27.000000 and TNOM = 27.000000

No. of Data Rows : 1
node voltages:
v(x) = -5.7e+00
v(y) = 8.57e+00
v(z) = 1.00e+01

Vsource: Independent voltage source
  device          v1
  dc              10
  acmag           0
  pulse           -
  sine            -
  sin             -
  exp             -
  pwl             -
  sffm            -
  am              -
  trnoise         -
  trrandom        -
  i               -0.285714
  p               2.85714

ngspice-2lplus done
```