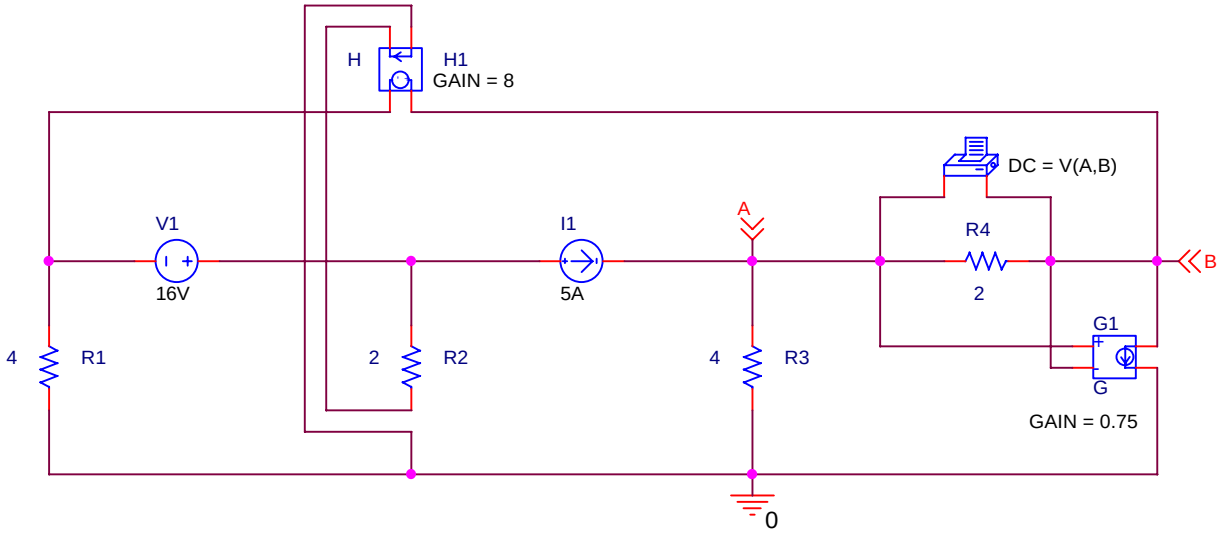
EGR 260
Circuit Analysis
File: Dependent Sources.opj

Analyzing Circuits with Dependent Sources

Purpose: Analyze the circuit shown below to determine the voltage V(A, B). Compare the appearance of this circuit to the same problem from a textbook shown on the next page. Dependent sources have a very different appearance.

Analysis: A DC Sweep will be used to vary the independent voltage source from 16V to 16V (the voltage printer will not work unless a DC sweep is performed).

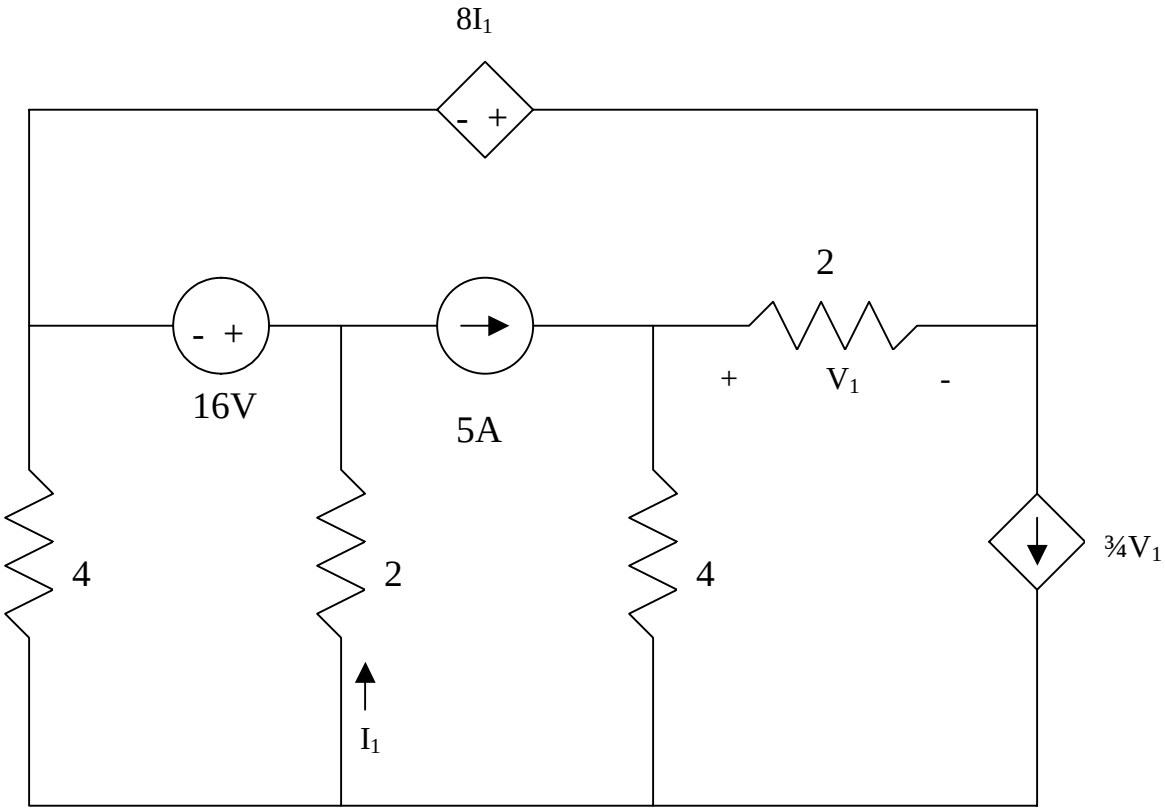


Notes:

1) The 4 types of dependent sources are called E, F, G, and H and are found in the ANALOG library.
   E = voltage-controlled voltage source
   F = current-controlled current source
   G = voltage-controlled current source
   H = current-controlled voltage source
2) When placing dependent sources, keep in mind that the round symbol is the source and the polarity or the arrow are connected to the control variable. Be sure that the correct polarity or current direction are used both for the source and for the control variable.
3) Be sure to set the GAIN property on the dependent source to the appropriate value. The default value is 1. The GAIN property is not automatically displayed, so:
   A) Double-click on the dependent source to edit its properties
   B) Right-click on the GAIN property in the screen for editing properties and change the Display Format to Name and Value.
   C) Go back to the schematic and the GAIN property should now be displayed. Double-click on it to change its value.

Title <Title>		
Size A	Document Number <Doc>	Rev <RevCode>
Date: Thursday, February 10	Sheet 1 of 1	

Problem 4.33 (from Electric Circuits by Nilsson)
Find the voltage V_1 .
(Answer: 8V)



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**** 02/10/ 22:16:38 ********** Evaluation PSpice  **************

 ** circuit file for profile: DC Sweep

 ****     CIRCUIT DESCRIPTION

*******************************************************************************

** WARNING: THIS AUTOMATICALLY GENERATED FILE MAY BE OVERWRITTEN BY SUBSEQUENT
PROFILES

*Libraries:
* Local Libraries :
* From [PSPICE NETLIST] section of pspiceev.ini file:
.lib nom.lib

*Analysis directives:
.DC LIN V_V1 16V 16V 1
.PROBE
.INC "dependent sources-SCHEMATIC1.net"

**** INCLUDING "dependent sources-SCHEMATIC1.net" ****
* source DEPENDENT SOURCES
R_R1         0 N00081  4
R_R2         N00100 N00037  2
R_R3         0 A  4
R_R4         B A  2
V_V1         N00037 N00081 DC 16V AC 1Vac
I_I1         N00037 A DC 5A AC 1Aac
H_H1         B N00081 VH_H1 8
VH_H1        0 N00100 0V
G_G1         B 0 A B 0.75

.PRINT         DC V([A],[B])

.END

**** 02/10/ 22:16:38 ********** Evaluation PSpice  **************

 ** circuit file for profile: DC Sweep

 ****     DC TRANSFER CURVES               TEMPERATURE =   27.000 DEG C

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  V_V1        V(A,B)

   1.600E+01   8.000E+00      So  V1 = V(A,B) = 8V

          JOB CONCLUDED

          TOTAL JOB TIME             .26
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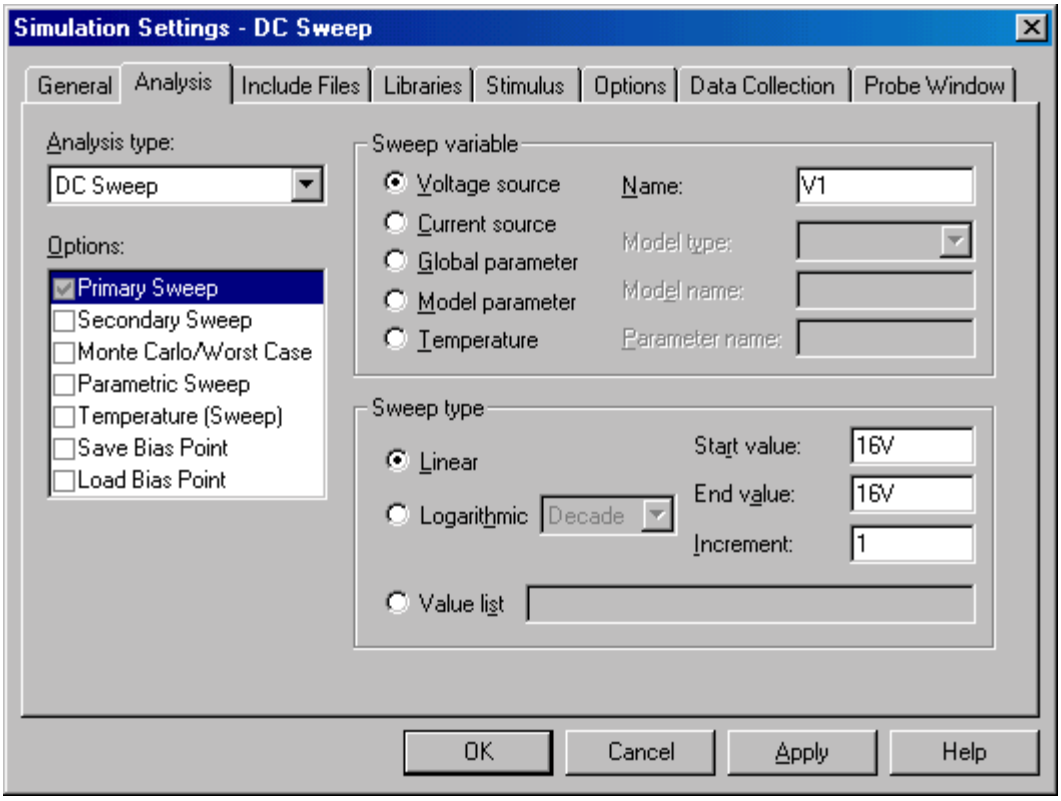
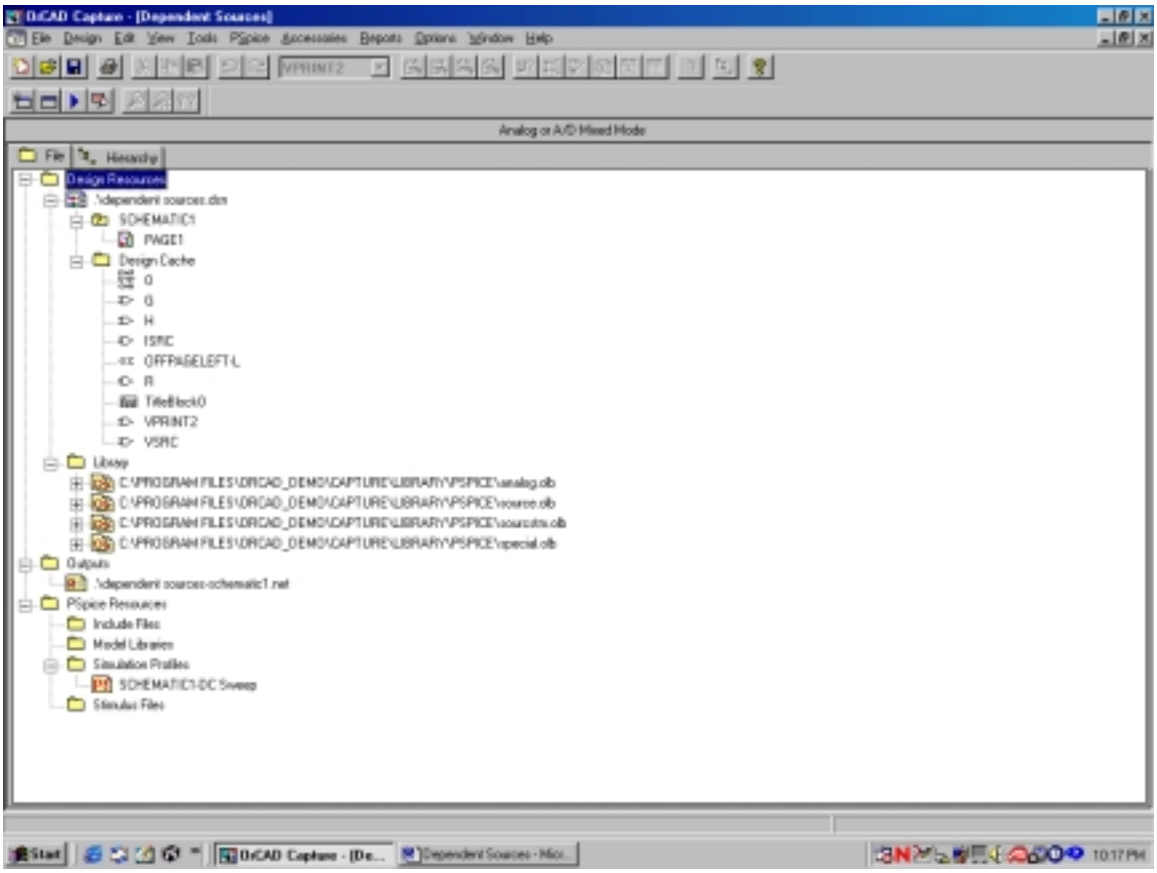

Simulation Settings - DC Sweep
General
Analysis
Include Files
Libraries
Stimulus
Options
Data Collection
Probe Window
Analysis type:
DC Sweep
Options:
Primary Sweep
Secondary Sweep
Monte Carlo/Worst Case
Parametric Sweep
Temperature (Sweep)
Save Bias Point
Load Bias Point
Sweep variable
Voltage source
Current source
Global parameter
Model parameter
Temperature
Name:
V1
Model type:
Model name:
Parameter name:
Sweep type
Linear
Logarithmic
Decade
Value list
Start value:
16V
End value:
16V
Increment:
1
OK
Cancel
Apply
Help


OrCAD Capture - [Dependent Sources]
Analog or A/D Mixed Mode
Design Resources
SCHEMATIC1
PAGE1
Design Cache
Libraries
Outputs
PSpice Resources
Include Files
Model Libraries
Simulation Profiles
SCHEMATIC1-DC Sweep
Stimulus Files