

ENGR 252 LAB #5 - Op Amp Models

"This lab & associated report should be completed individually"

Objective

Utilizing computer Aided Design and Analysis tools to design and analyze circuits with Op Amp Models.

Related Principles

- *Electrical Circuits* textbook by Nilsson
- *OrCAD Capture and PSpice Integrated Tutorial*

Equipments

- Windows-based PC
- Cadence orCAD 16.6 lite
http://www.engrCS.com/tools_programs/16.6_OrCAD_Lite_Capture&PSpice_Products.zip
- USB hard disk or other removable drives

Supplies

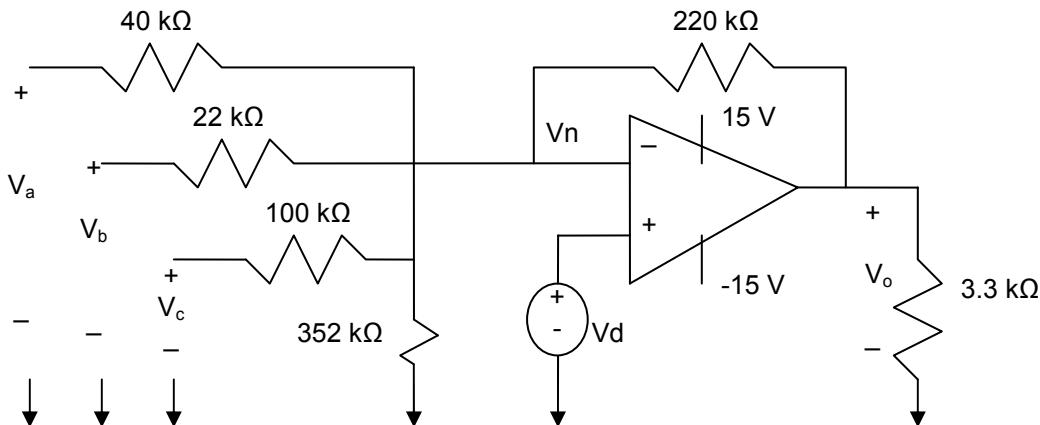
- None

Preparation

- OpAmp Model
This lab uses uA741 (a general purpose OpAmp) with the model available in the EVAL library of PSpice. It is important to insure that positive and negative supplies are connected for proper operation.
- Op Amp (uA 741) Data Sheet available at:
http://www.engrCS.com/components/uA741_OpAmp.pdf

Experiment #1

For the following circuit when $V_a = 4V$, $V_b = 9V$, $V_c = 13V$ and $V_d = 8V$:



- Find V_o using KCL analysis (Assume Ideal Op Amp).
- Find V_o using OrCAD and DC model of uA741 Op Amp.
- Find V_o using the uA 741 library model from the PSpice EVAL library.
- Compare your results and explain the reason for any differences observed.
- Which component has the highest impact on V_o . A component impact is measured using the following relation:

$$\text{impact} = \frac{\text{change in } V_o \text{ (Volts)}}{\% \text{ change in component Value}}$$

Report Requirements

This lab and report must be completed individually. All reports must be computer printed (Formulas and Diagrams may be hand drawn) and at minimum include:

For each Experiment

- a) Clear problem statement; specify items given and to be found.
- b) Identify the theory or process used.
- c) Documents resulting circuit schematics, Net list, simulation results, and other relevant results.

For the report as a whole

- a) Cover sheet with your name, class, lab, completion date and team members' names.
- b) Lessons Learned from the experiments.
- c) A new experiment and expected results which provide additional opportunity to practice the concepts in this lab.