EE 254

Project 3

Schmitt Trigger Design and Testing

Design and test a Schmitt trigger, using a standard LM741 Op-Amp, to produce a custom voltage transfer characteristic. Individual goals are:

- To obtain the design criteria, for the required external positive feedback circuit, for a custom transfer characteristic. Choose suitable standard component and power supply values for the external circuit.
- Build and test the designed Schmitt trigger circuit. Tweak the external circuit parameters to minimize deviation from the desired transfer characteristic. Required tests to be performed:
    - Demonstrate the Schmitt trigger operation using a variable DC input voltage source.
    - Demonstrate the Schmitt trigger operation using the XY oscilloscope mode.
- Simulate the designed circuit, using either Microcap or PSpice, and MATLAB.

Preliminary test to perform: Run a basic zero crossing detection test to obtain the values of V_H and V_L, for the chosen values of ±VCC, before obtaining the design criteria.

Specifications:

Name	V_I <<	V_I >>	V_S	V_{TH}-V_{TL}
	V_L	V_H	-1V	4V
	V_H	V_L	1.5V	6V
	V_L	V_H	-2.5V	3V
	V_L	V_H	-1.5V	5V
	V_H	V_L	2.5V	2V

Deliverables:

Project Demonstrations: Project demonstrations will be held in class (PCTR 1030/34) on Tuesday, November 4, 2013 from 12:00 pm to 2:00 pm.

Report: A detailed handwritten report must include the design and analysis for each type of PA along with supporting measurements, calculations, waveforms,

datasheets, simulations, and supporting information. The report is due at the time of demonstrations.