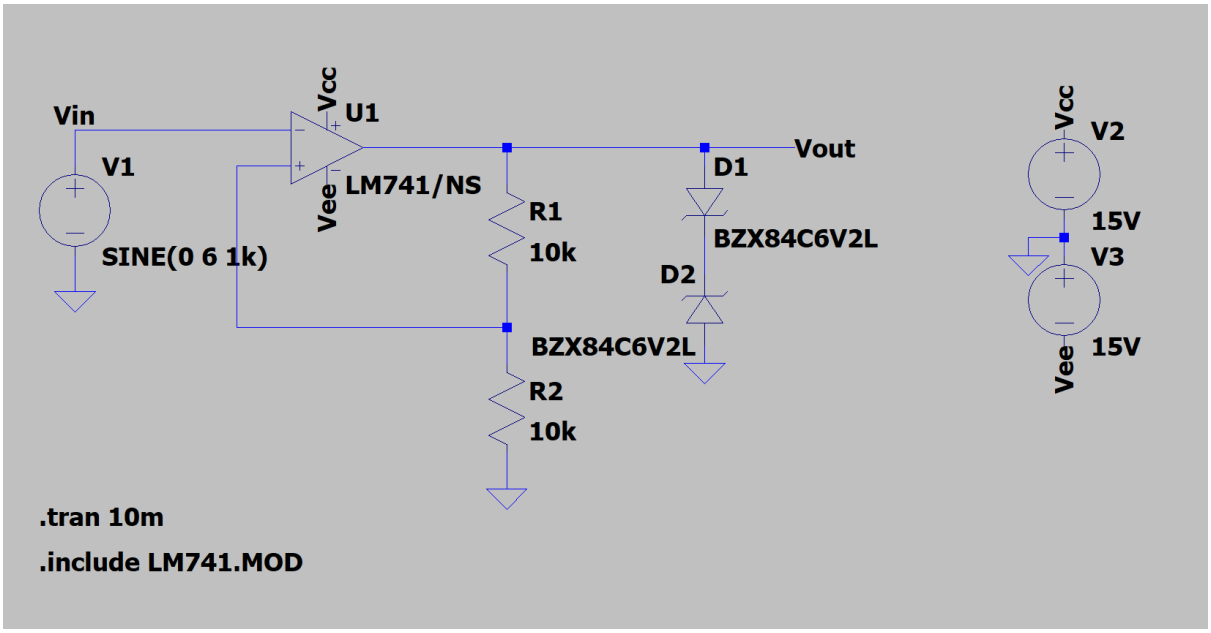
**Aim:** To study the working of Schmitt trigger, Multivibrators and precision rectifiers.

**Software used:** LTspice

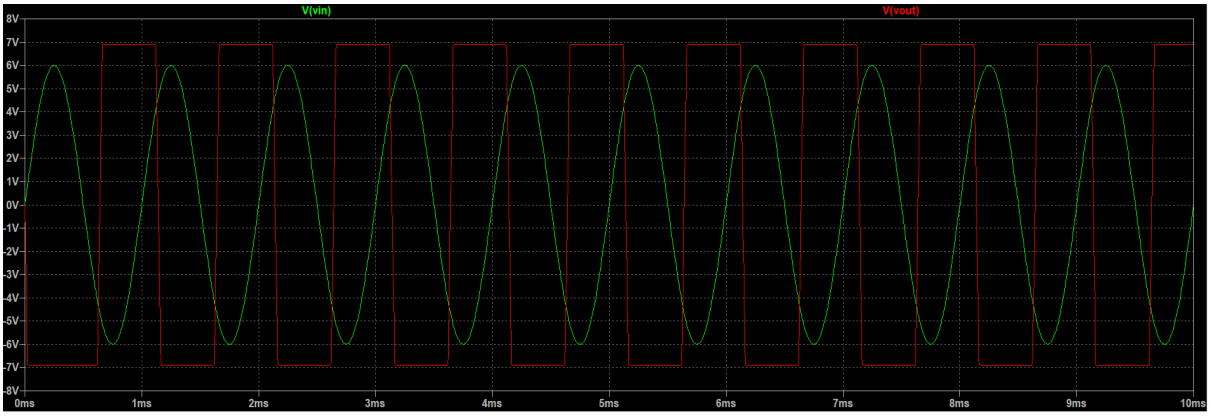
## Schmitt trigger:

### (a) When Va is connected to ground:

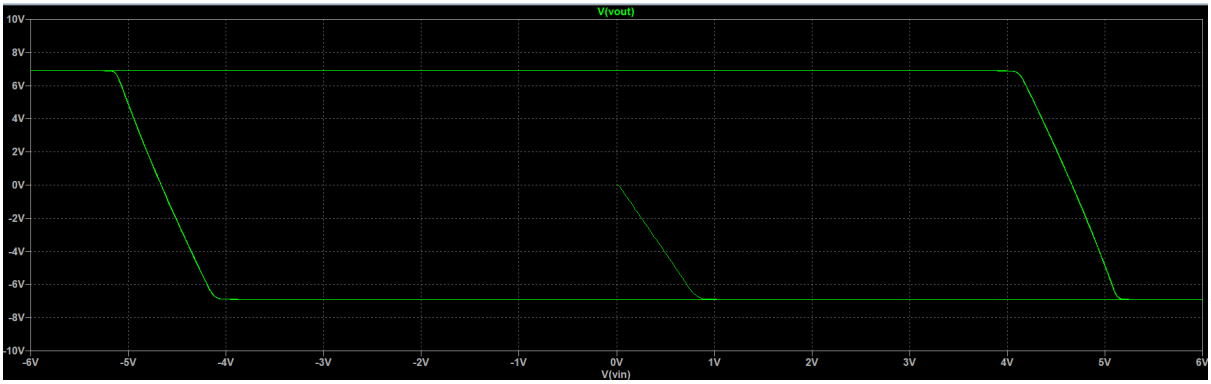
**Circuit:**




**Output waveform on scope when 6V, 1kHz sine wave is applied:**

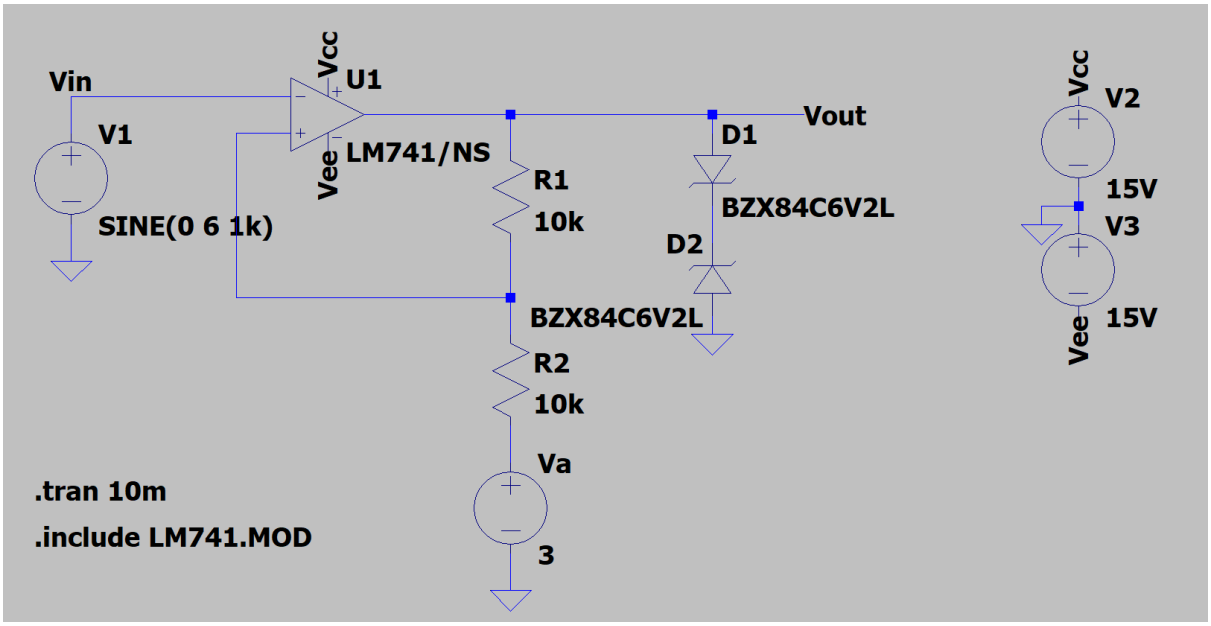



**Input and output waveforms in X-Y mode:**

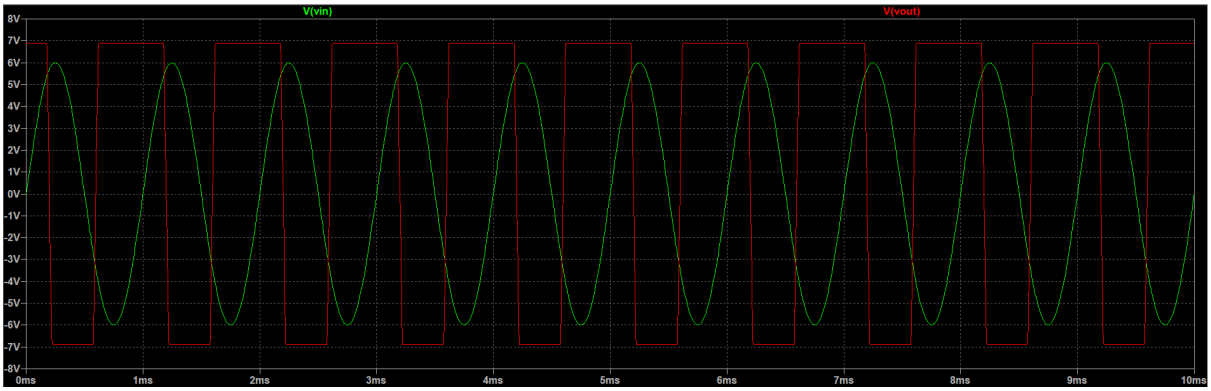


## (b) When Va is connected to 3V:

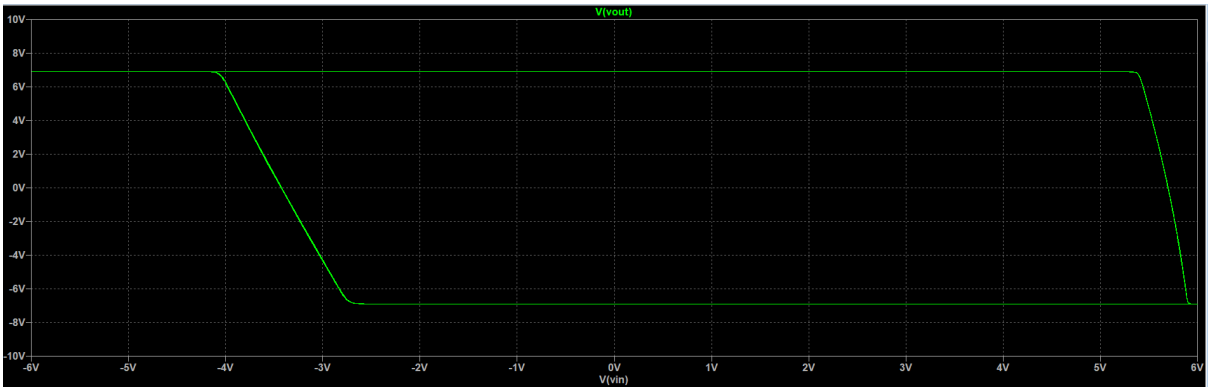
**Circuit:**




**Output waveform on scope when 6V, 1kHz sine wave is applied:**

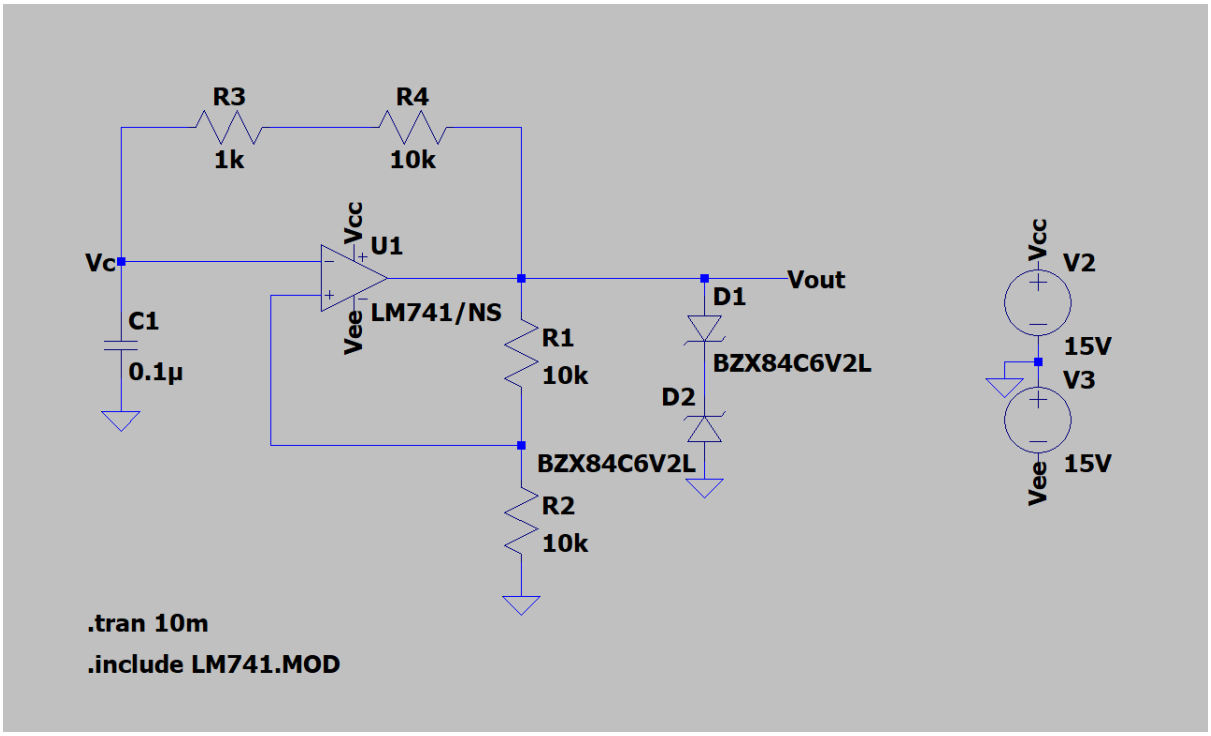



**Input and output waveforms in X-Y mode:**

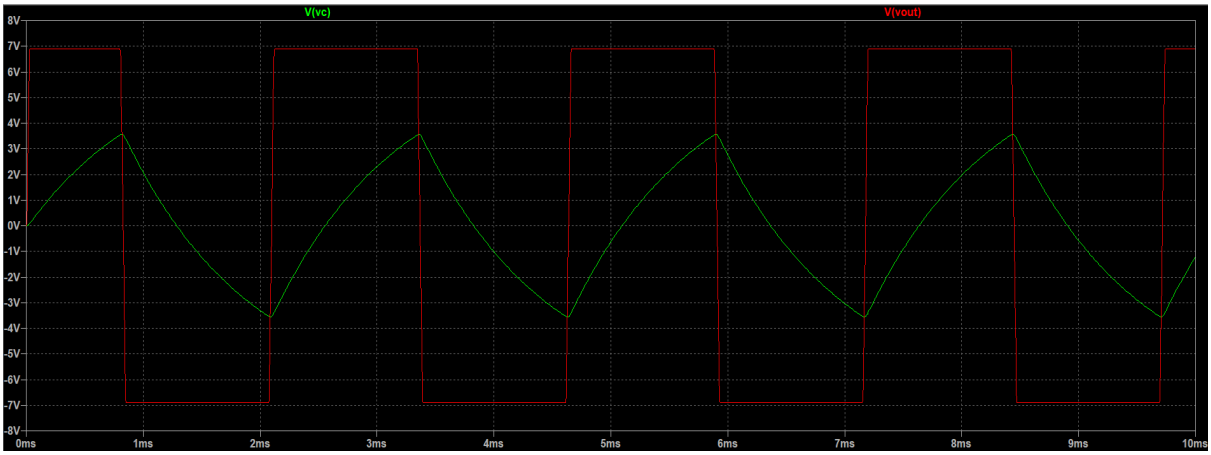


## Astable multivibrator:

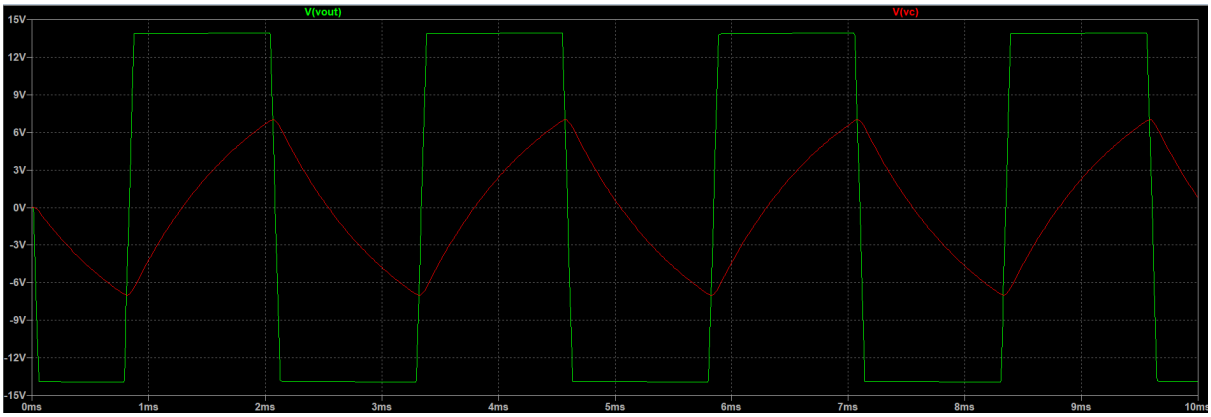
**Circuit:**




**Output voltage** (red) **and voltage across capacitor** (green) **observed on scope:**




**Observed waveforms after disconnecting the zener diodes:**

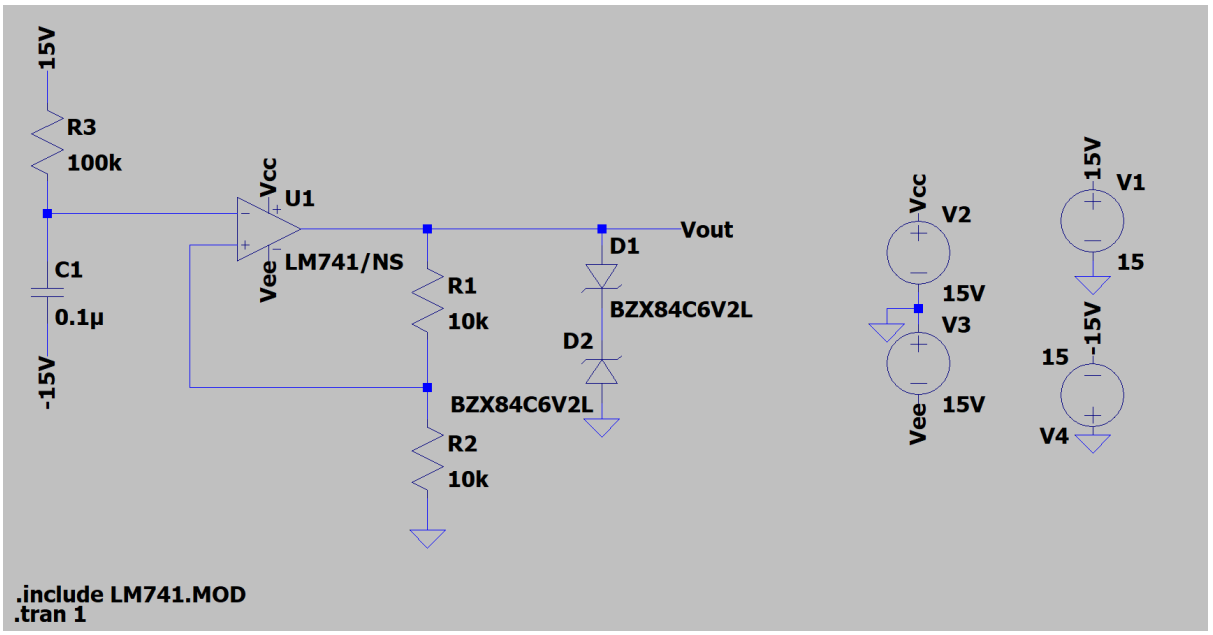



No, The frequency of waveforms didn't change because the time period of the output voltage and voltage across capacitor is given by

$$T = 2RC\ln\left(1+\frac{2R_2}{R_1}\right)$$

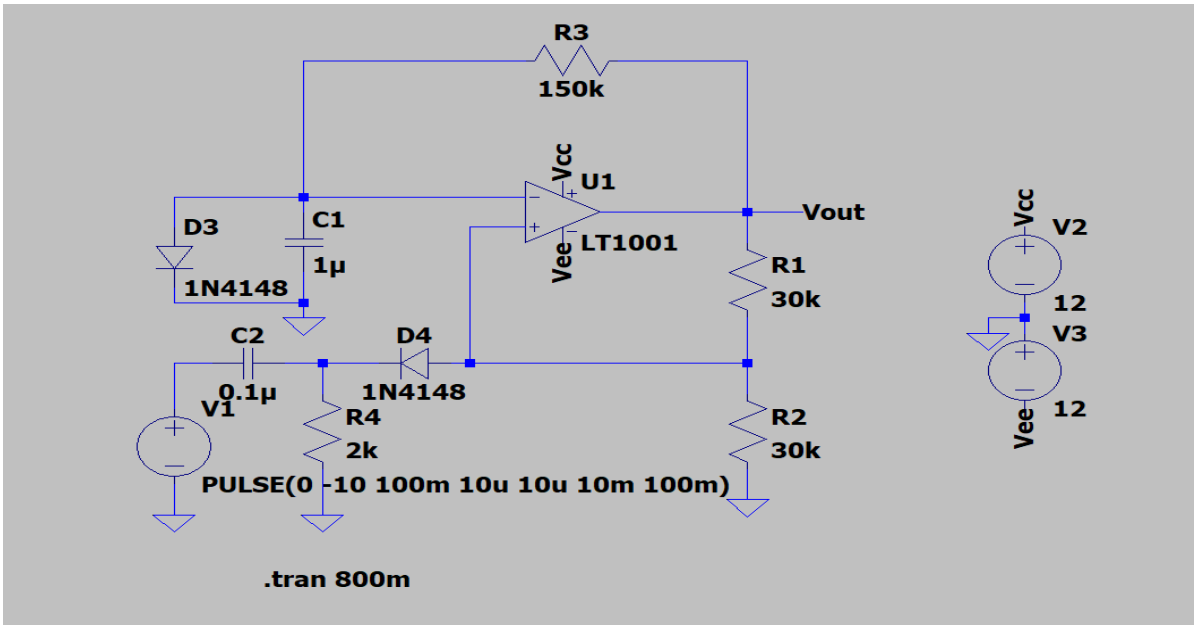
## Monostable multivibrator:

### Circuit:

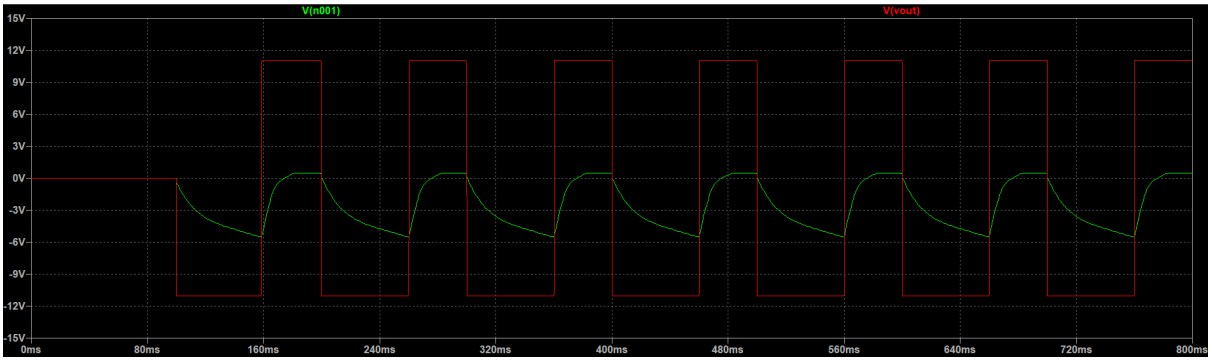



*The circuit above is the given circuit in the lab manual from which I am not getting the correct output.

### Circuit explained in lab:



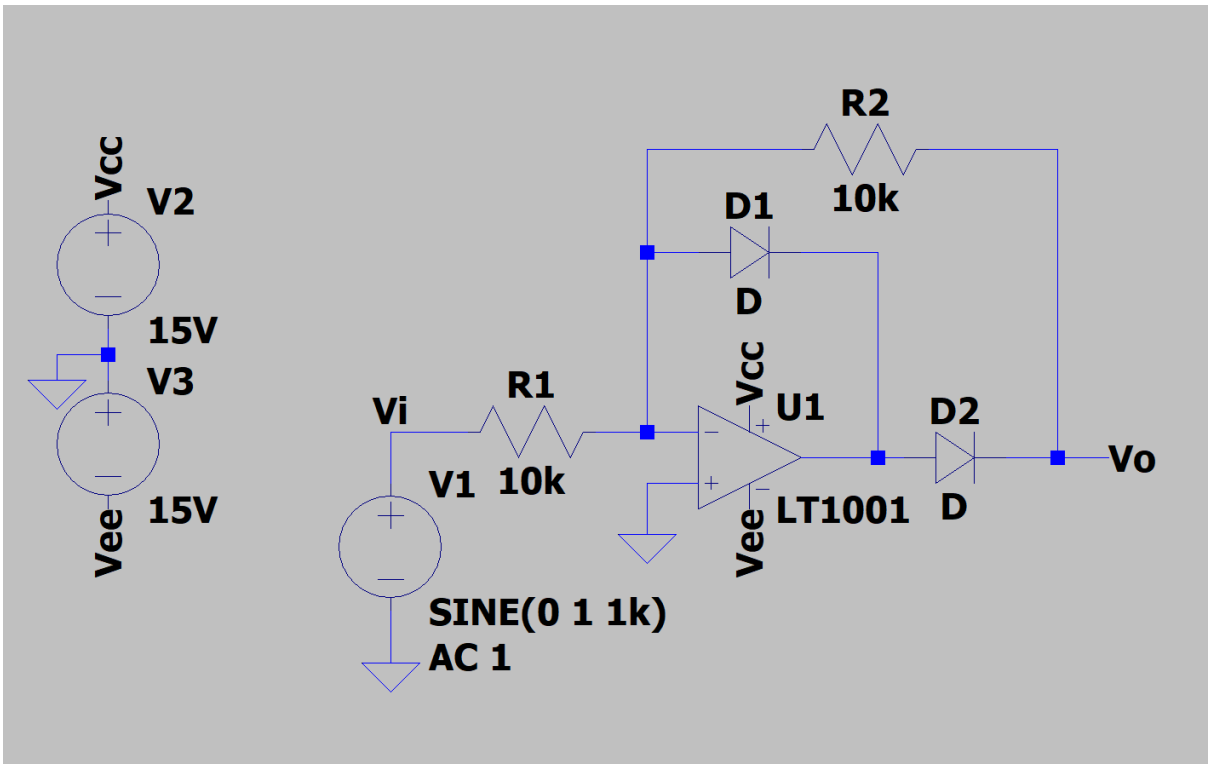

### Output voltage and Voltage at the inverting opamp's terminal:



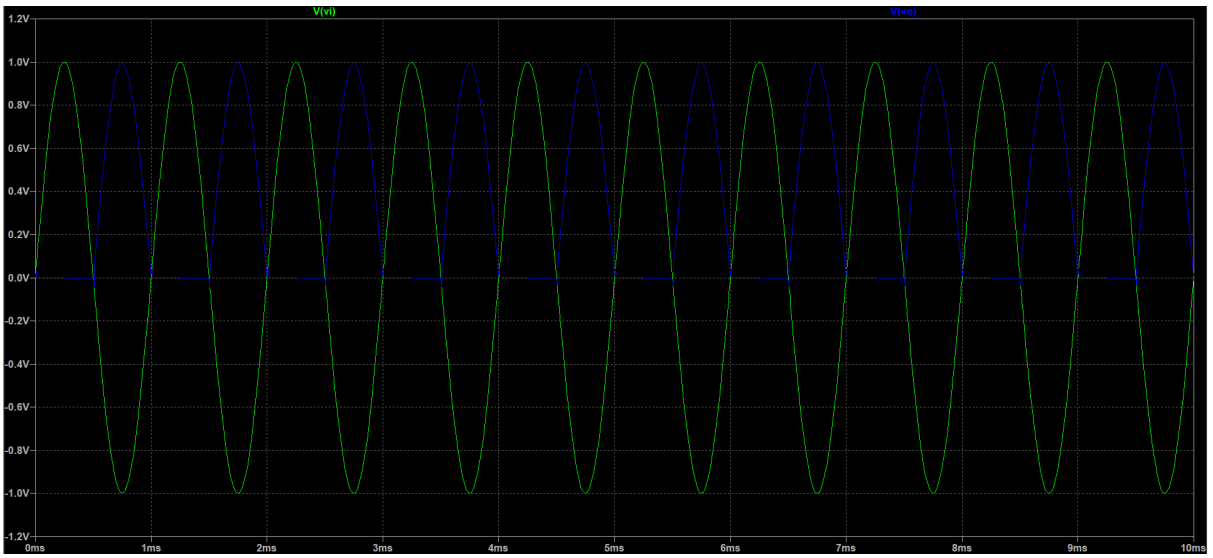
## Half wave Rectifier:

### A) Positive Rectifier:

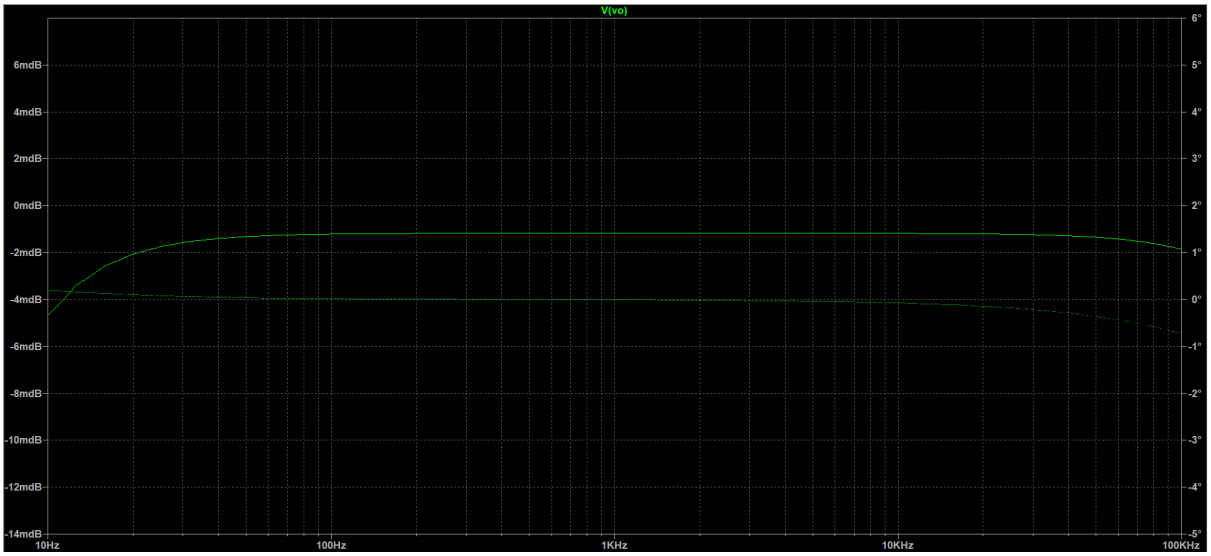
**Circuit:**




**Input and Output voltage waveforms on scope when 1V, 1kHz sine wave is applied:**

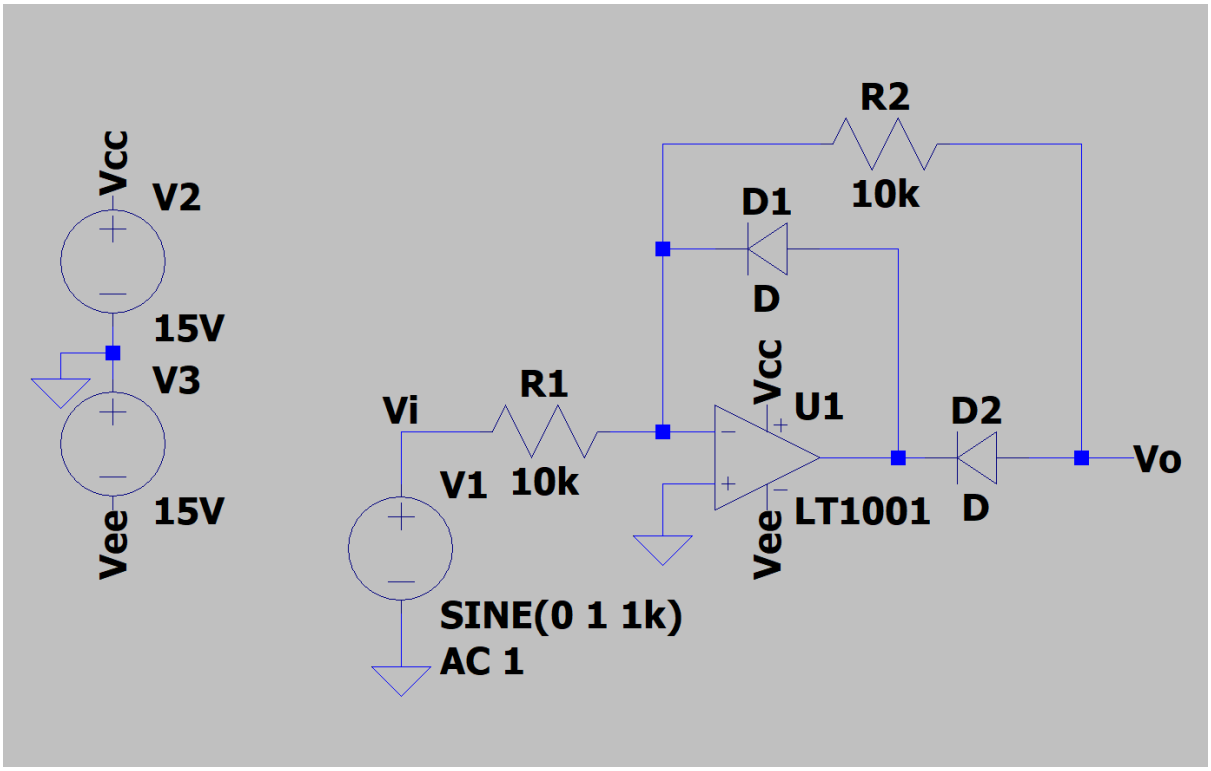


## Transfer characteristics:

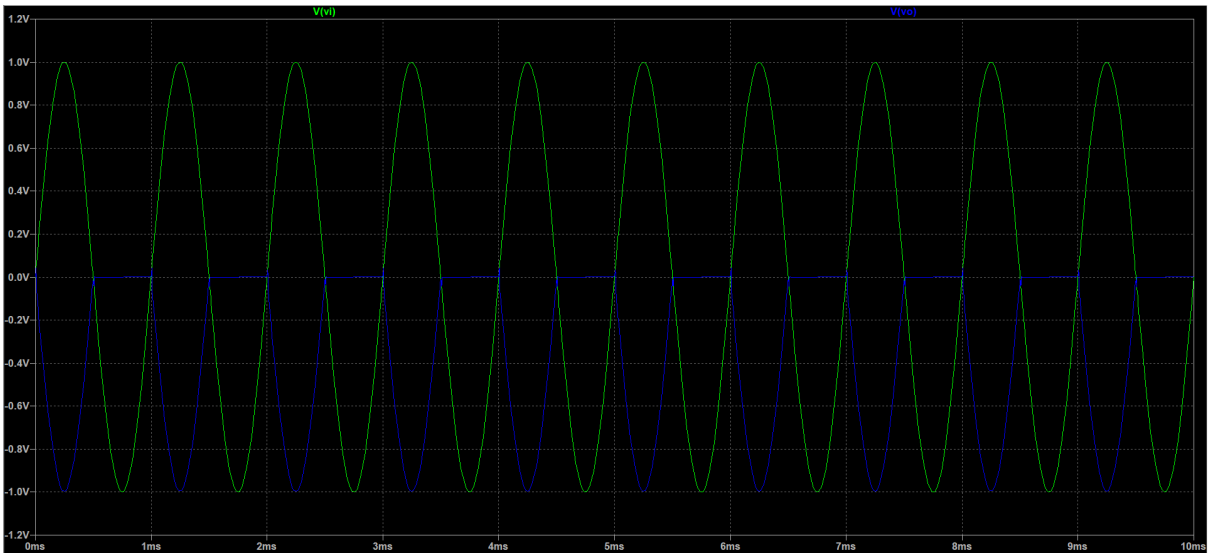



## B) Negative Rectifier:

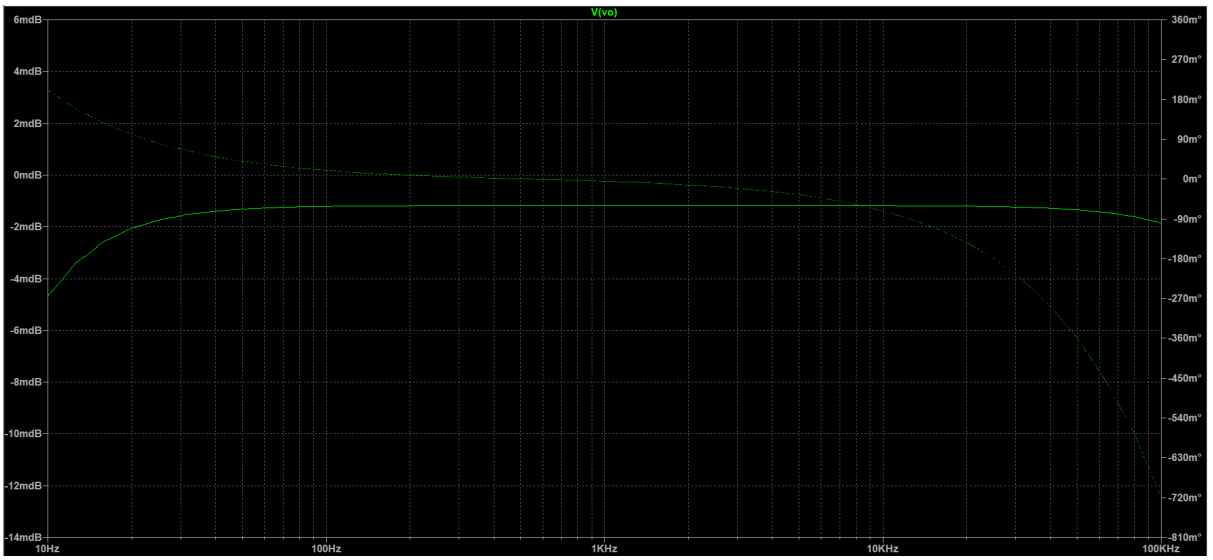
## Circuit:



## Input and Output voltage waveforms on scope when 1V, 1kHz sine wave is applied:



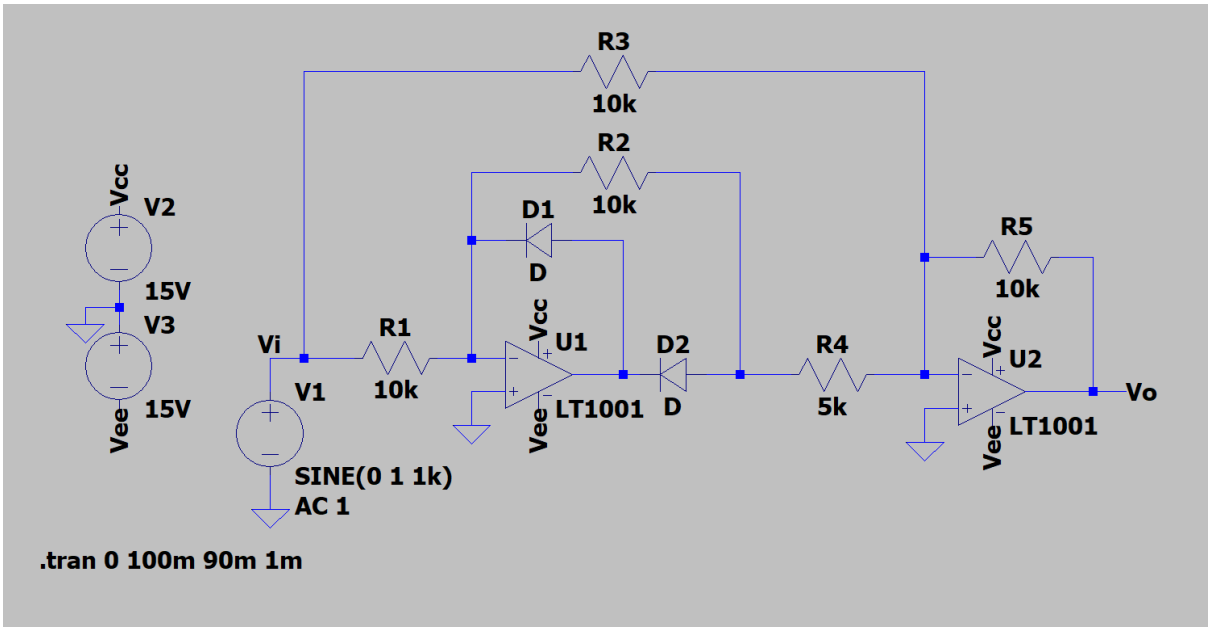

## Transfer characteristics:



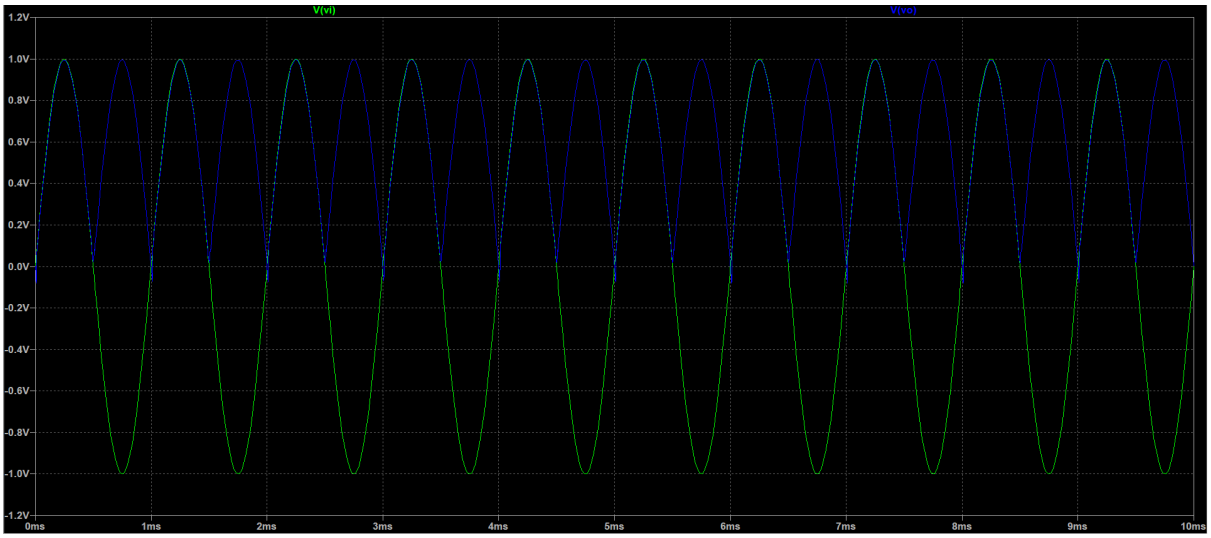
# Full wave Rectifier:

## A) Positive Rectifier:

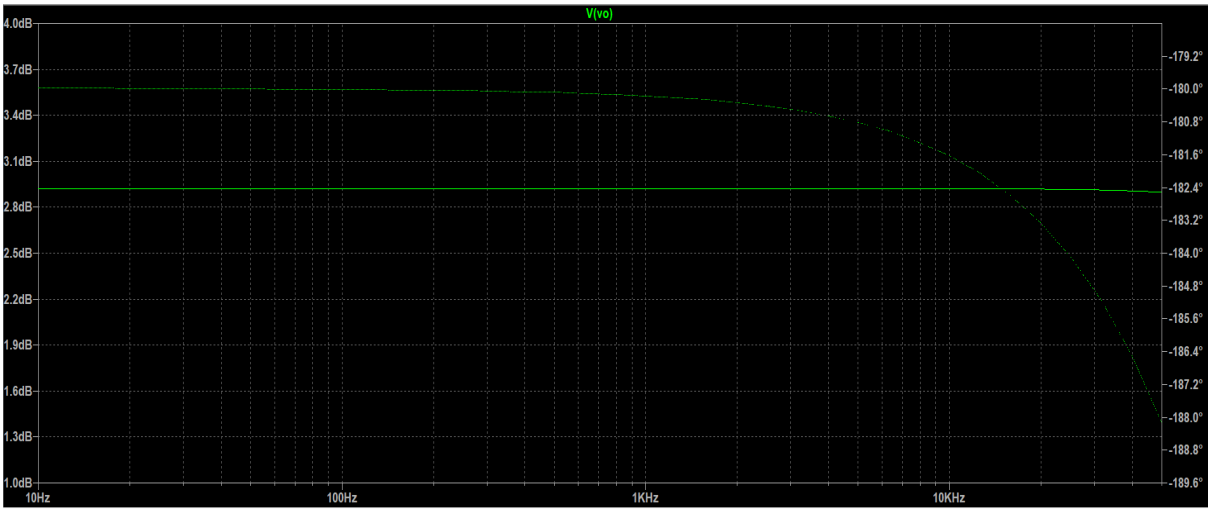
### Circuit:




### Input and Output voltage waveforms on scope when 1V, 1kHz sine wave is applied:

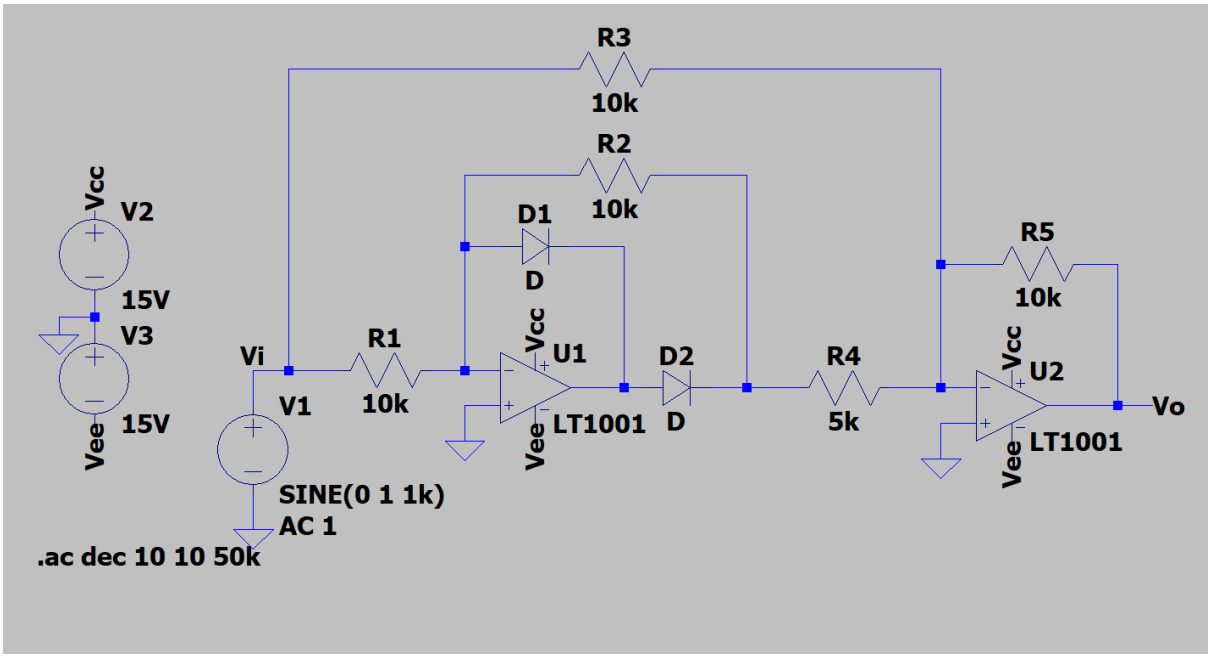



### Transfer characteristics:

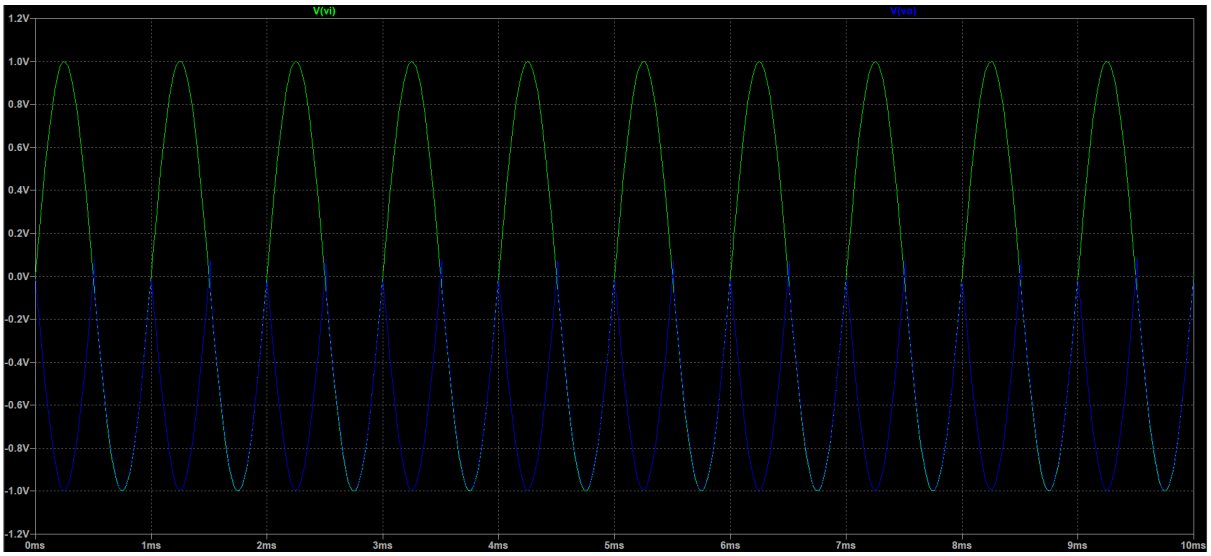


## B) Negative Rectifier:

## Circuit:




## Input and Output voltage waveforms on scope when 1V, 1kHz sine wave is applied:




## Transfer characteristics: