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## Lab VI

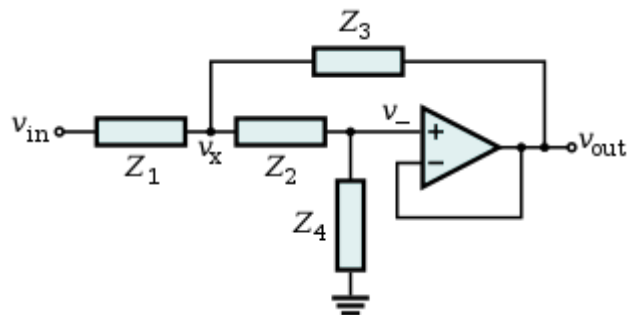
### **Study and design of active filters using LM741**

#### Objectives

To study the following active filters using op-amp LM741

- Low Pass Filter
- High Pass Filter
- Band Pass Filter and find out  
and
- Plot of voltage gain vs frequency (Bode Plot) for all three different filters
- Calculate 3dB frequency and compare it with simulation in a tabular format
- Also draw the schematic for each filter

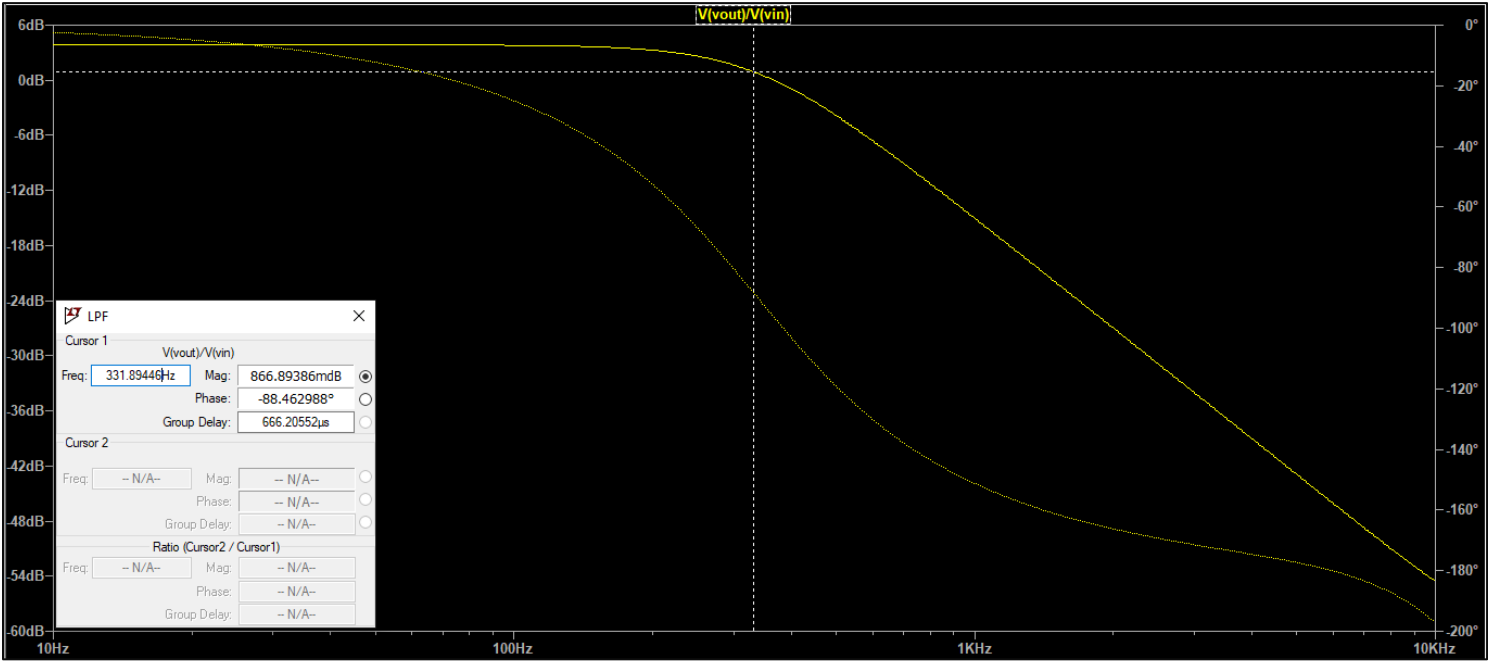
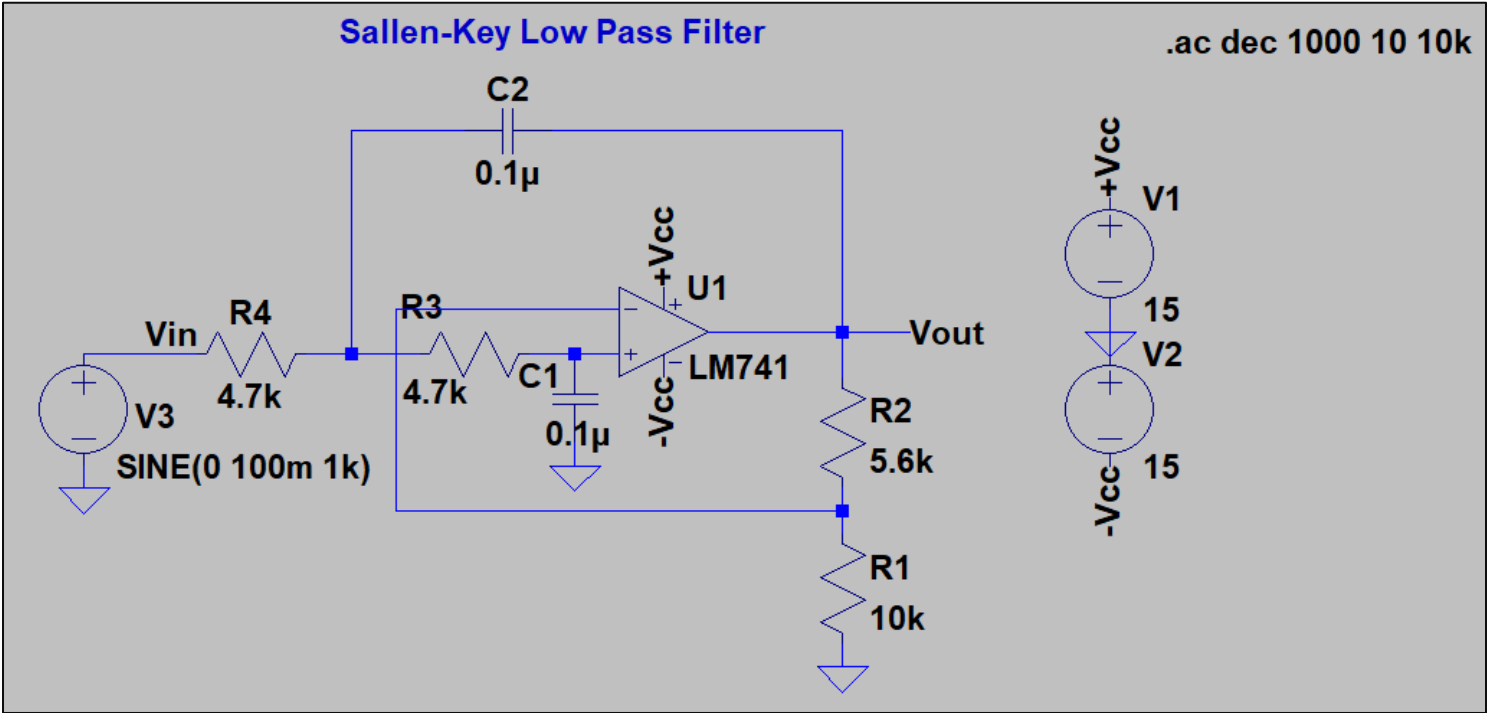
#### Sallen-Key Active Filters



The Sallen-Key Topology

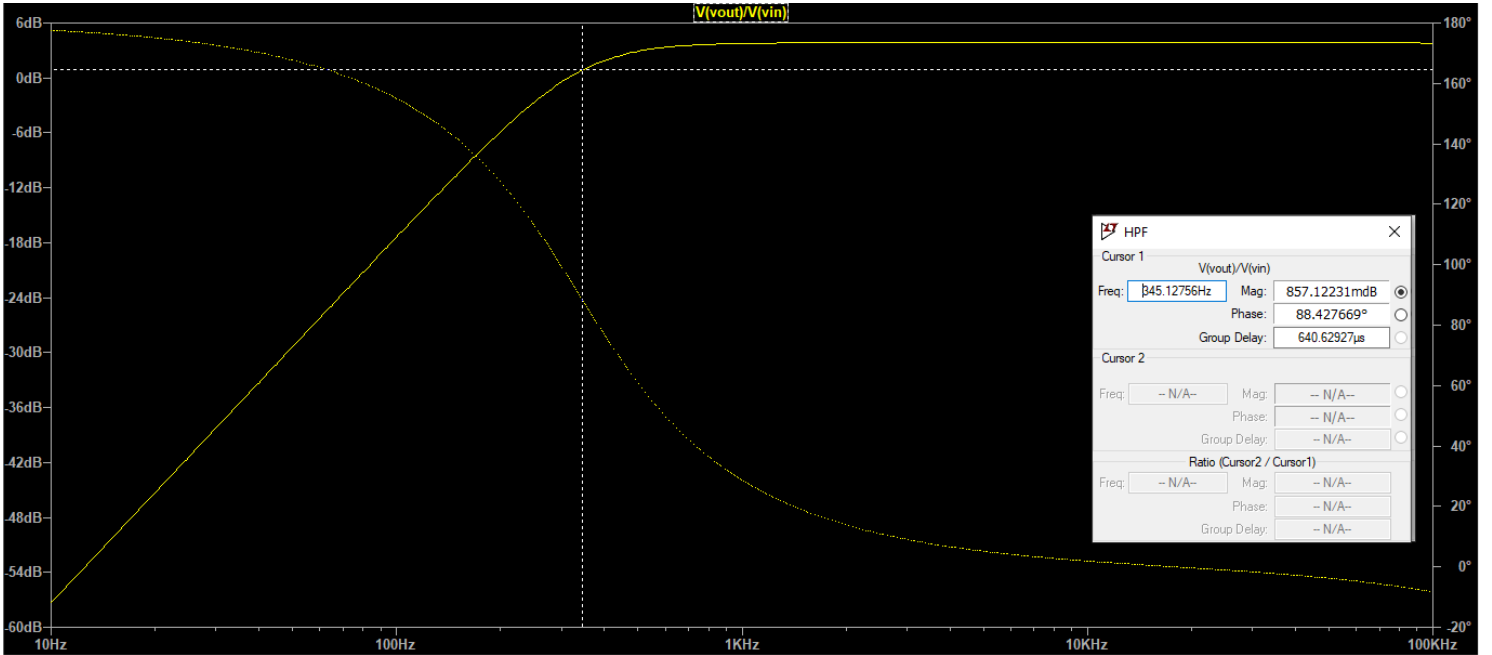
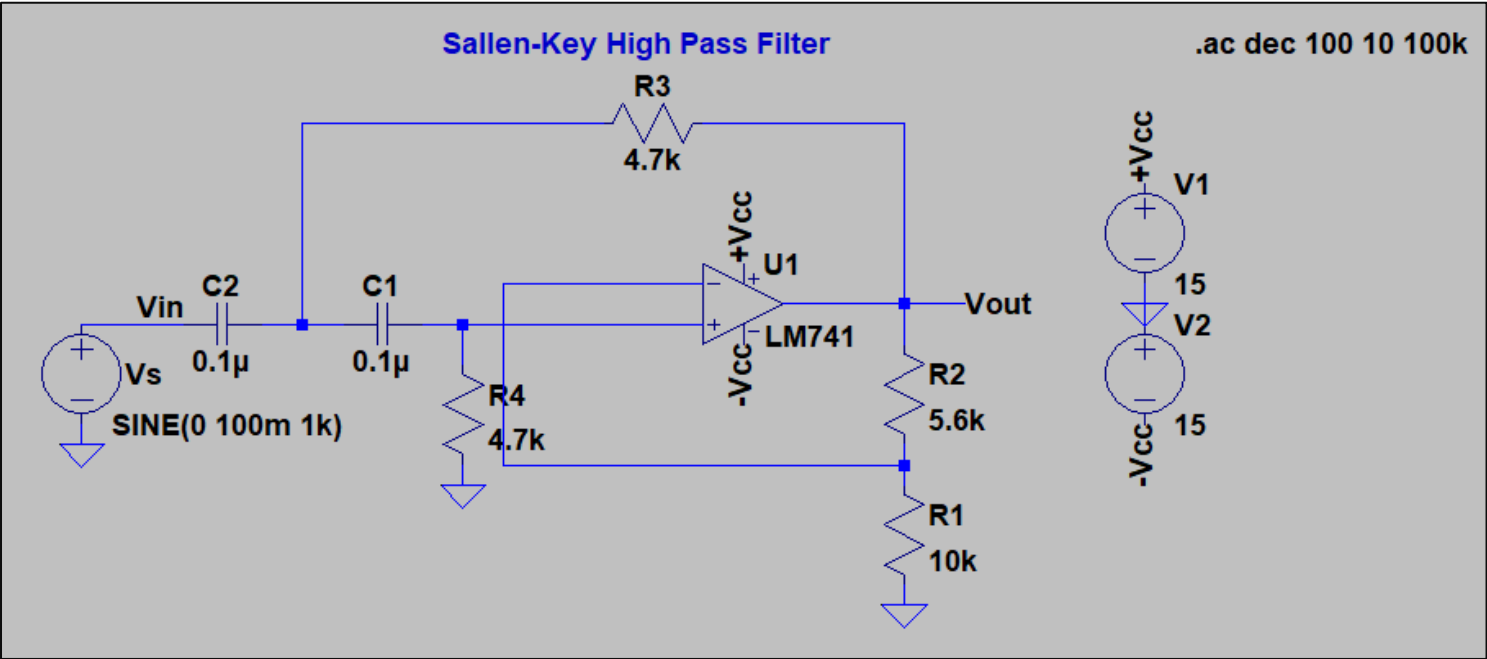
# 1. Low Pass Filter

Schematic and Frequency Response Plot



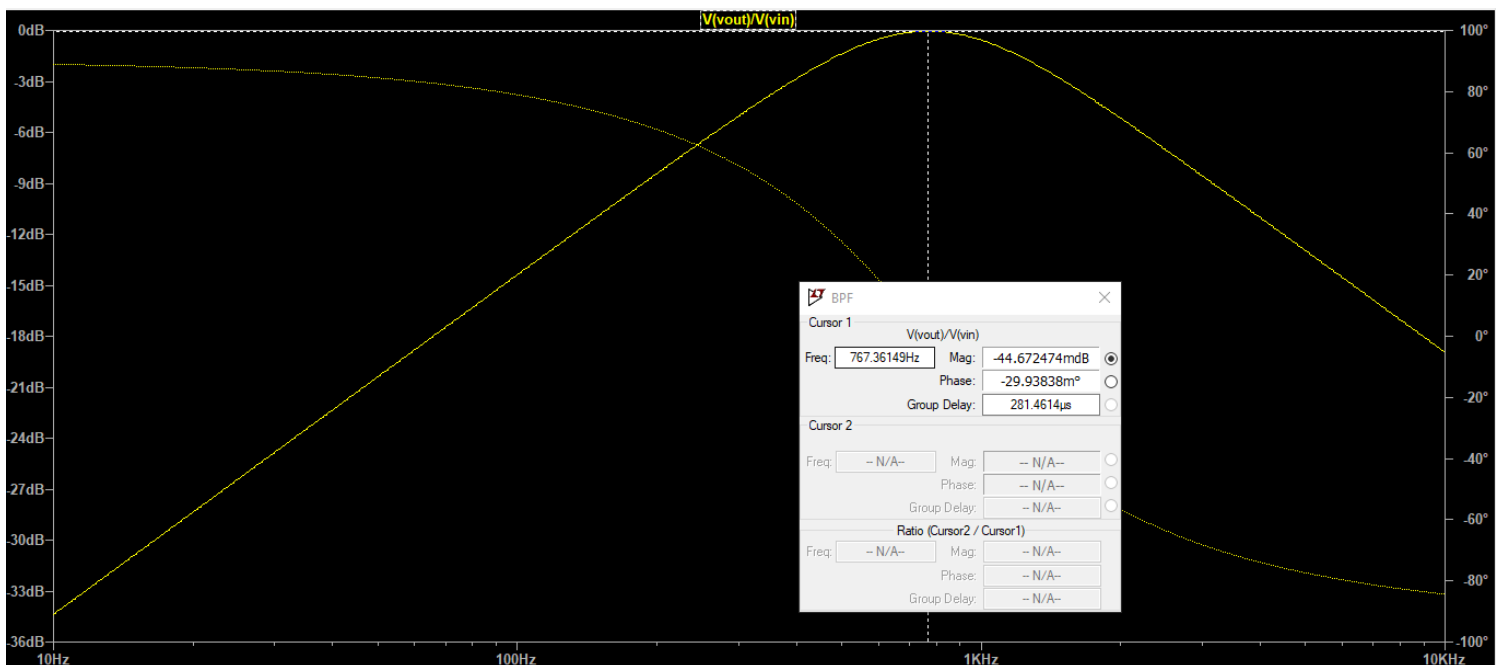
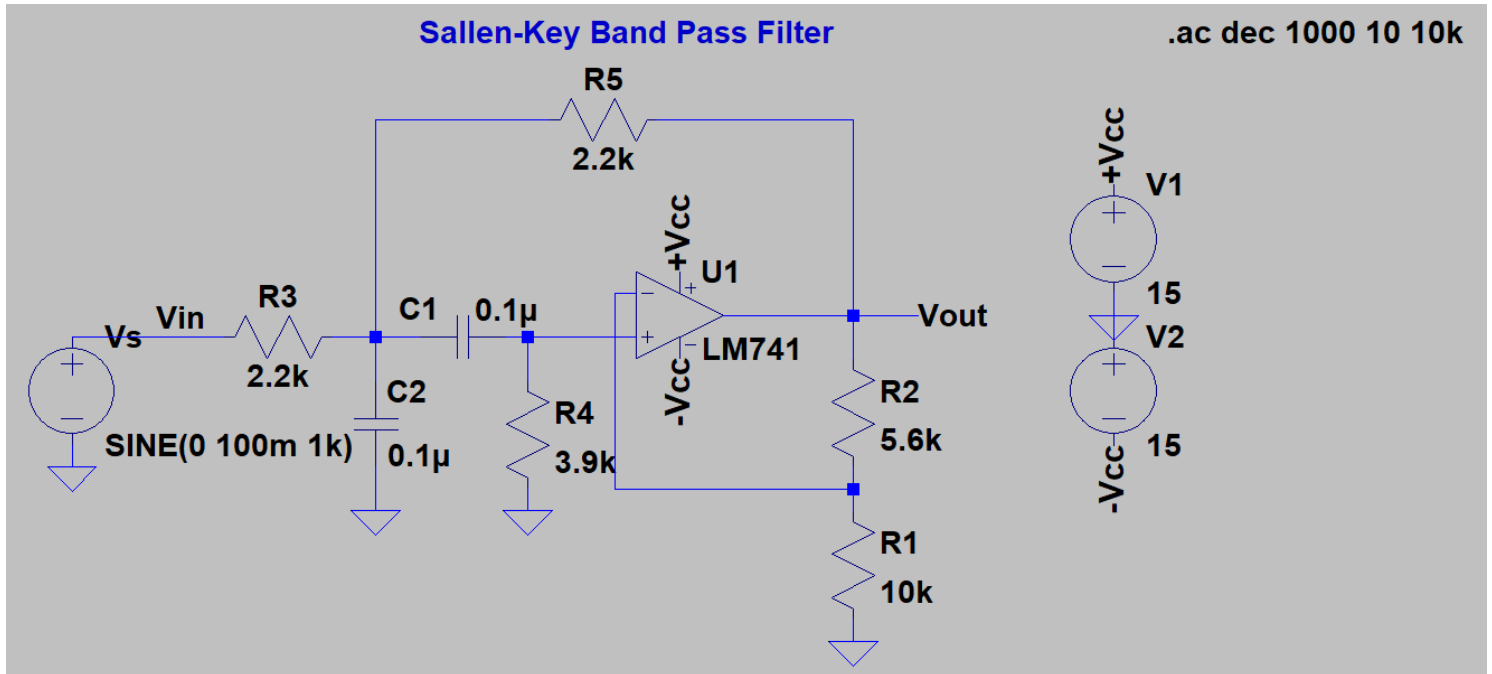
2. High Pass Filter

Schematic and Frequency Response Plot



### 3. Band Pass Filter

#### Schematic and Frequency Response Plot



## Results

Type of filter	Theoretical value of 3dB/cutoff frequency	Simulated value of 3dB/corner frequency
Low pass filter	$\frac{1}{2\pi RC} = \frac{1}{2\pi \times 4.7k \times 0.1\mu} = 338.627 \text{ Hz}$	331.894 Hz
High pass filter	$\frac{1}{2\pi RC} = \frac{1}{2\pi \times 4.7k \times 0.1\mu} = 338.627 \text{ Hz}$	345.127 Hz
Band-pass filter	$\frac{1}{2\pi \sqrt{\frac{R_3 R_4 R_5 C_1 C_2}{R_3 + R_5}}} = \frac{1}{2\pi \times 2071.23 \times 0.1\mu} = 768.407 \text{ Hz}$	767.361 Hz