DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING
BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY
COURSE NO.: EEE 208
EXPT. NO. 07

Name of the Experiment: Linear Application of Operational Amplifier

Objective

To investigate the use of operational amplifier as inverting multiplier, inverting summer, inverting integrator, inverting differentiator and differential amplifier.

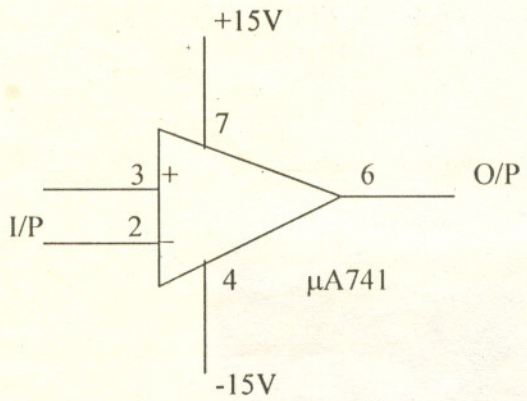
Prelab Calculations and Simulation Using Spice (Home Work)

Students must perform the following SPICE simulations at home before attending the lab

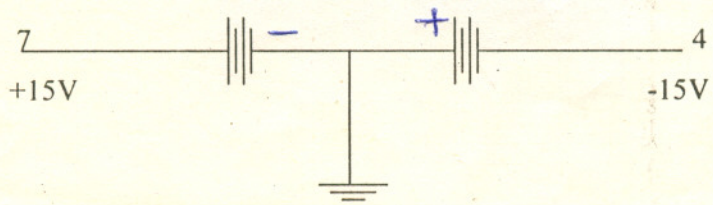
1. For the different configurations shown in Fig (2), using SPICE, simulate the different configurations and sketch the simulated output waveforms.

Circuit Diagrams

N.B. The Op Amp μA741 has eight terminals to be connected as shown in Fig. (1).



(a)



(b) DC Supply Connection

Fig. (1)

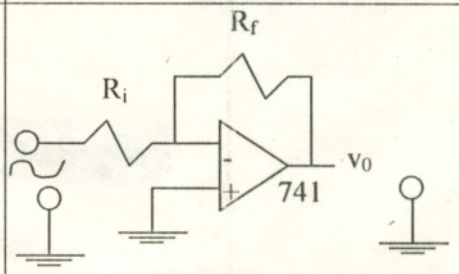
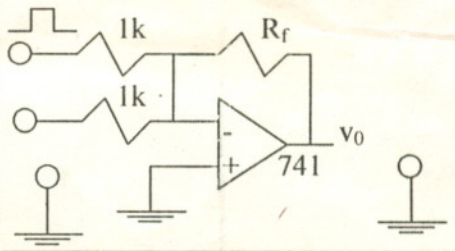
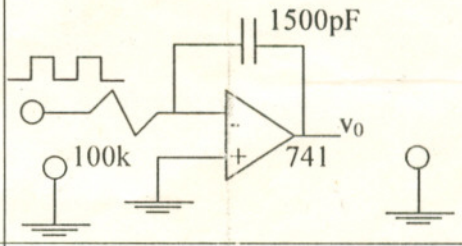
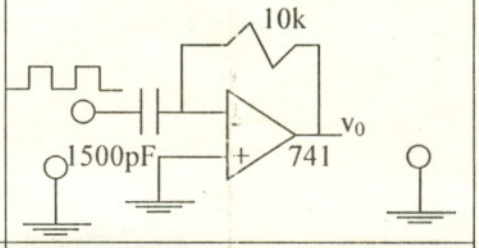
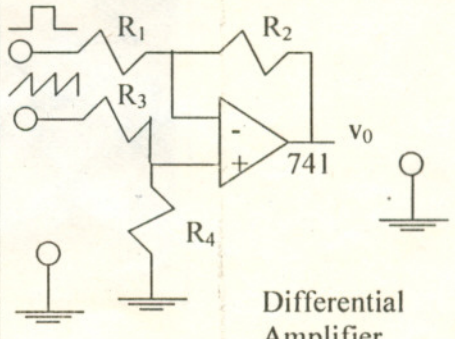
Operations	Circuits
1. Inverting Multiplier R_i=1k, R_f=1k,10k,100k Vi=2v p-p sin, 1kHz	
2. Inverting Summer R_f=1k,10k,100k V_1=2v pp, 1kHz(rect or sin) V_2=1v DC	
3. Inverting Integrator Vi= 2v pp, 1kHz *or suitable*	
4. Inverting Differentiator Vi= 2v pp, 1kHz *or suitable* 	
5.Differential Amplifier (as Subtractor) If $R_2/R_1 = R_4/R_3$ ……..(A) then $V_o = R_2/R_1(V_2 - V_1)$ V_1 =2v pp, 1kHz (sin or rect, to R_1) V_2 =1v DC, (to R_3) Satisfy (A) & set R_2/R_1=1 or 2	

Fig. 2

Procedures

1. Construct the circuits shown in Fig. (2). Apply the ***appropriate voltage*** in each case with frequencies of the order of 1 KHz. In each case measure the output waveform by the oscilloscope and sketch it in the Table 2

Table2: Linear Application Outputs.

Operations	Outputs		
1. Inverting Multiplier R_i=1k, R_f=1k,10k,100k Vi=2v p-p sin, 1kHz	R_f=1k	R_f=10k	R_f=100k
2. Inverting Summer R_f=1k,10k,100k V_1=2v pp, 1kHz(rect or sin) V_2=1v DC	R_f=1k	R_f=10k	R_f=100k
3. Inverting Integrator Vi= 2v pp, 1kHz *or suitable*	Out put For V_i=Vsin	Out put For V_i=Vrec	Out put For V_i=1 V
4. Inverting Differentiator Vi= 2v pp, 1kHz *or suitable*	Out put For V_i=Vsin	Out put For V_i=Vrec	
5.Differential Amplifier (as Subtractor) If $R_2/R_1 = R_4/R_3$ then……..(A) $V_o = R_2/R_1(V_2 - V_1)$ V_1 =2v pp, 1kHz (sin or rect, to R_1) V_2 =1v DC, (to R_3) Satisfy (A) & set R_2/R_1=1 or 2	V_i=Vsin, R_2/R_1=1	V_i=Vrec, R_2/R_1=2	

Reference: Op-amps & Linear ICs - Coughlin

Updated by: Yeasir Arafat on 7th February, 2006