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ANALOG ELECTRONICS CIRCUIT LAB.	
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ASSIGNMENT: 6	
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University of Engineering and Management. Kolkata.	
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Experiment No.: 06.	
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Title: Study of Voltage Adder using Op-Amp.	
Aim: The aim of the experiment is to study and understand the voltage adder circuit which was built using the inverting and non inverting op Amp.	ling
inverting and non inverting op Amp.	
Apparatus Required: (i) Op-Amp (3 channel)	No.
(ii) Voltage Source (AC)	74
(iii) Resistors	
(iv) Voltmeters (probes).	
(v) Ground	
(vi) Connecting wires.	74
Theory: We saw previously in the invorting Op-Amp that H	re
inverting Op-Amp has a single input voltage (Vin	
applied to the inverting input terminal. If we add more input	u l
resistors to the input, edch equal in value to the output	Í
resistor which is input (Rin) we end up with another operal	ional
amplifier is called a Summing Amplifier, "summing invertor	,,
or even a "voltage adder"	- 19
In the simple summing amplifier the output voltage (No	(+,
now becomes proportional to the sum of the input voltages V.	
Va Va etc Then we can modify the original equation by investing	Lina
V2. V3 etc. Then we can modify the original equation for investigation amplifier to take acount of those new inputs thus:	Ug
Pu -	. Py
$I_{\pm} = I_1 + I_2 + I_3 = -\frac{V_1}{Riw} + \frac{V_2}{Riw} + \frac{V_3}{Riw}$	- 19
- LRW RW RW	1.4
Inverting equation: Vout = - Rf X Vin	A
then, - Vout = Rf V1 + Riv V2 + Rf V3	
the same all the formation of the same is	41
However all the impedences are equal in value then we can simplify the above equation we have.	
simplefy the appre equation we have,	

Ldui	River the state of
i'	while the street along the har
g o	This allows the output voltage to be easily calculated if more
	input resistors are connected to the amplifiers inverting input
	terminal. The input impedence of each row individual channel
	is the value of their respective input resistors R. Ra. R3 etc.
	Now here comes the property of gain. gain (Av) = Vout/Vin
	But as we can implement inverting summing amplifiers, we
Julen	can also use the non inverting input of the Op-Amp to create
L.V.	the non-inverting summing amplifier. The biggest advantage
	is that because there is no virtual earth condition across the
	input terminals, its input impedance is much higher than that of
le .	the standard inverting amplifier. Here.
<u> </u>	
	$I_{R_1} + I_{R_2} = 0$ (KCL).
	$\frac{V_1 - V_1}{R_1} + \frac{V_2 - V_1}{R_2} = 0.$
l.	RI K2
1 /1	$\frac{\left(\frac{V_1}{R_1} + \frac{V_1}{R_1}\right) + \left(\frac{V_2}{R_2} - \frac{V_1}{R_2}\right) = 0.}{R_1}$
į.	
	If we make two input resistances equal in value then R1 = R2 = K
	$V + = \frac{V_1 + V_2}{2}$
	Then the standard equation for calculating the output voltage.
	VOUT = [1+ RA] V1+ V2
E .	TANA - 1 SAME OF THE PROPERTY
6).	The more investing amplifiers closed from gain voltage. Ay is given
di.	1 + RA/ RB. The we make the closed loop voltage gain equals
	The non inventing amplifiers closed loop gain voltage Av is given as. I + RA/ RB. If we make the closed loop voltage gain equals to 2 as. RA = RB Then the output voltage becomes the sum of
	all input voltages as shown.
	$Vout = (1+1) \frac{V_1 + V_2}{2}$
g F	
	$=(V_1+V_2)$
,	

	Procedure :- (i) Open Muttsim live simulator in your browser and click on the create circuit section.) After that drag and drop the required apparatus from the box and put them in the right position according the circuit disgram.
	and click on the create curcuit section.
1:5	After that drag and drop the required apparatus from the
-hard	har and put them in the right position according the circuit
7/1	diagnam did
	(//103//104/)
	connect the apparatus using the connecting wires and then save the circuit
/ia	A Run the simulation and then solit the said was to have the
C) Run the simulation and then split the window to have the observation in the grapher section.) Take the observation and provide the conclusion accordingly.
1.0	Take the absorber of the sensitive and accordingly
	Take the observation and provide the contained accountings
	in the principle of the state o
	ireuit Diagram:
	1) I lead to the second of the
	Voltage Adder circuit using Inverting Op-Amp:
	VI A
	1 kn (~ -7v).
_	TO VO.
	(*) (**) (**) (**) (**) (**) (**) (**)
-	1 V2 0 1 K-D V0. 1 V V0. 1 V V0. 1 V Op-amp (invertedly connected).
-	op-amp (invertidly connected)
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r = e 5 3 -4	M MANGE THE RESERVE TO SERVE THE PROPERTY OF THE RESERVE TO SERVE THE PROPERTY OF THE PROPERTY
	20 may g 3 2
-	$V_{OUT} = -(V_1 + V_2 + V_3).$
500+	In the particular part of the control and
	A CONTRACT OF THE ASSESSMENT OF THE CONTRACT O
- 1	Fig: Voltage addur circuit using inverting Op-Amp.
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