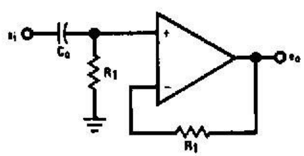
STANDARD OPERATIONAL AMPLIFIER CIRCUITS

Non-Inverting Buffer



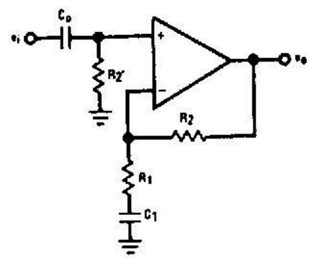
$A_v = 1$

$R_{in} = R_1$

$f_o = \frac{1}{2\pi R_1 C_0}$

Definitions:
Av = Closed loop AC Gain
fo = Low frequency −3dB corner
Rin = Input Impedance

Non-Inverting AC Amplifier

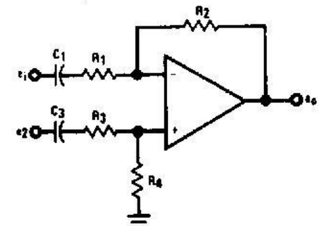


$A_v = 1 + \frac{R_2}{R_1}$

$R_{in} = R_2$

$f_o = \frac{1}{2\pi R_2 C_0} = \frac{1}{2\pi R_1 C_1}$

Difference Amplifier



$e_o = \left(\frac{R_1 + R_2}{R_3 + R_4}\right)\frac{R_4}{R_1} e_2 - \frac{R_2}{R_1} e_1$

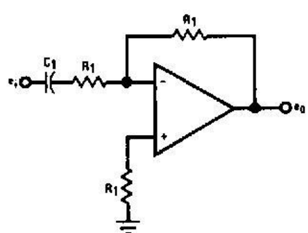
IF $R_1 = R_3$* AND $R_2 = R_4$* THEN

$e_o = \frac{R_2}{R_1}(e_2 - e_1)$

$f_o = \frac{1}{2\pi R_1 C_1} = \frac{1}{2\pi (R_3 + R_4) C_3}$

$R_2 = R_4$ FOR MINIMAL OFFSET ERROR

Inverting Buffer

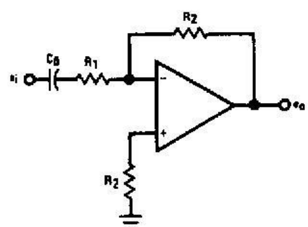


$A_V = -1$

$R_{in} = R_1$

$f_o = \frac{1}{2\pi R_1 C_1}$

Inverting AC Amplifier

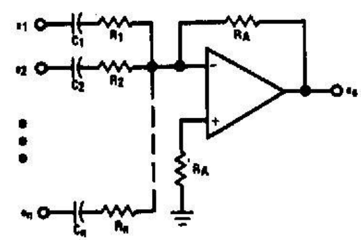


$A_v = -\frac{R_2}{R_1}$

$R_{in} = R_1$

$f_o = \frac{1}{2\pi R_1 C_0}$

Inverting Summing Amplifier



$e_o = -R_A\left(\frac{e_1}{R_1} + \frac{e_2}{R_2} + \ldots + \frac{e_n}{R_N}\right)$

IF $R_1 = R_2 = \ldots = R_N$ THEN

$e_o = -\frac{R_A}{R_1}(e_1 + e_2 + \ldots + e_n)$

THE SUPPLY CONNECTIONS HAVE BEEN OMITTED IN THE ABOVE CONFIGURATIONS FOR THE SAKE OF CLARITY.