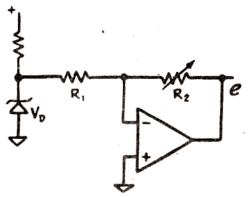
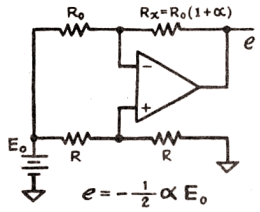
TYPICAL OPERATIONAL AMPLIFIER APPLICATIONS
for MODELLING, MEASURING, MANIPULATING, and MUCH ELSE

PRECISION VARIABLE VOLTAGE SOURCE



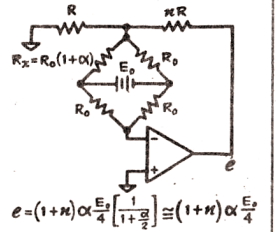
$e = -V_D \frac{R_2}{R_1}$

BRIDGE AMPLIFIER (ACTIVE BRIDGE, ULTRALINEAR)



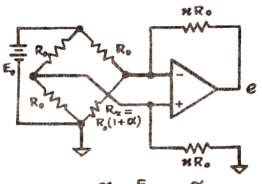
$e = -\frac{1}{2} \alpha E_0$

BRIDGE AMPLIFIER (FLOATING SUPPLY)



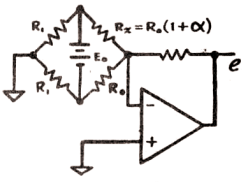
$e = (1+n)\alpha \frac{E_0}{4}\left[\frac{1}{1+\frac{\alpha}{2}}\right] \cong (1+n)\alpha \frac{E_0}{4}$

BRIDGE AMPLIFIER (ONE END GROUNDED)



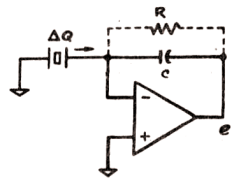
$e = -\frac{n}{2} \frac{E}{1+\frac{1}{2n}} \frac{\alpha}{1+\alpha} \cong -\frac{n}{2} \frac{E}{1+\frac{1}{2n}} \alpha$

BRIDGE AMPLIFIER (MID-POINT GROUNDED)



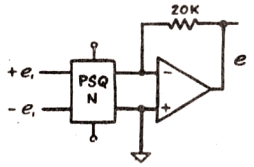
$e = \frac{E_0}{4} n\alpha \left[\frac{1}{1+\frac{\alpha}{2}}\right] \approx \frac{E_0}{4} n\alpha$

CHARGE AMPLIFIER



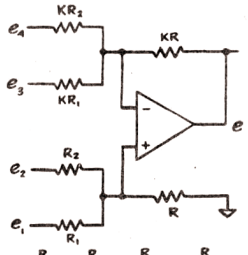
$-e = \frac{\Delta Q}{C}$

PRECISE WIDE BAND SQUARER



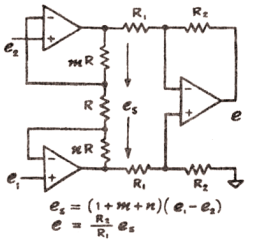
$e = \frac{1}{10} e_i^2$

ADDING SUBTRACTOR



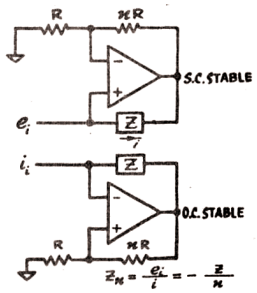
$e = \frac{R}{R_1} e_1 + \frac{R}{R_2} e_2 - \frac{R}{R_1} e_3 - \frac{R}{R_2} e_4$

LOW-COST, LOW-NOISE HIGH-INPUT IMPEDANCE DIFFERENTIAL-TO-SINGLE-ENDED AMPLIFIER



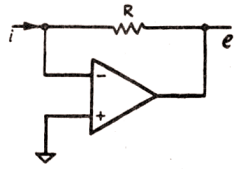
$e_s = (1+m+n)(e_1 - e_2)$
$e = \frac{R_2}{R_1} e_s$

NEGATIVE IMPEDANCES



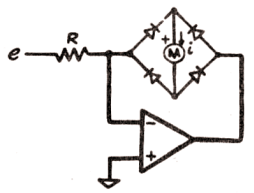
$Z_N = \frac{e_i}{i} = -\frac{Z}{n}$

CURRENT-TO-VOLTAGE TRANSRESISTOR



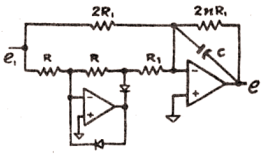
$-e = iR$

PRECISION AC-DC CONVERTER (METER OUTPUT)



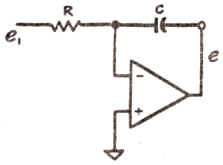
$i = \left|\frac{e_i}{R}\right|$

PRECISION FULL-WAVE RECTIFIER-FILTER "AC-DC CONVERTER"



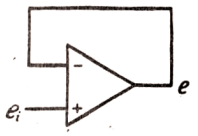
$e = n\left|e_1\right|\left[\frac{1}{1+2R_2CP}\right]$

STABLE INTEGRATOR



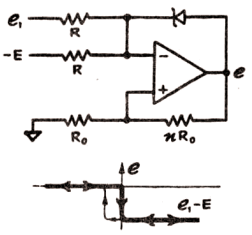
$-e = \frac{1}{RC}\int e_1 dt$

FOLLOWER (ELECTROMETER)

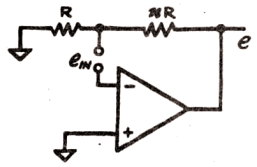


$e = e_i$

PRECISE VOLTAGE OR CURRENT COMPARATOR WITH HYSTERESIS

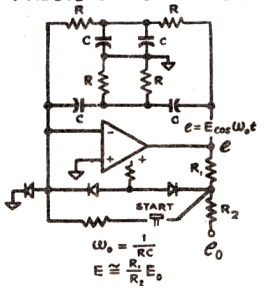


FLOATING SOURCE PREAMPLIFIER



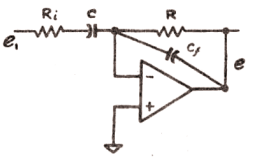
$e = (1+n)e_{IN}$

PRECISION OSCILLATOR



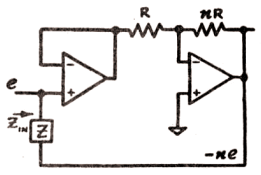
$\omega_0 = \frac{1}{RC}$
$E \cong \frac{R_1}{R_2} E_0$

STABLE LOW-NOISE DIFFERENTIATOR



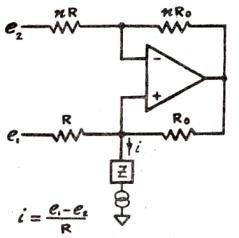
$-\frac{e}{e_i} = \left[RCP\right]\left(\frac{1}{(1+RC_fP)(1+R_iCP)}\right)$

IMPEDANCE SCALER



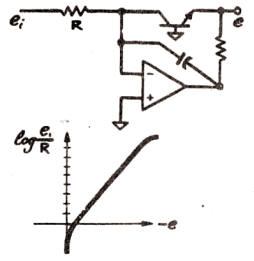
$i_{IN} = \frac{(1+n)e}{Z}$
$Z_{IN} = \frac{Z}{1+n}$

VARIABLE CONTROLLED CURRENT SOURCE

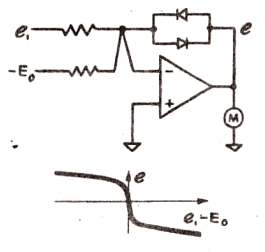


$i = \frac{e_1 - e_2}{R}$

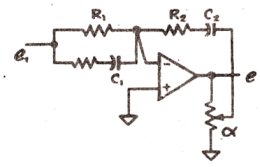
PRECISE WIDE-RANGE LOGARITHM 9-DECADES



GRADED NULL MEASUREMENT



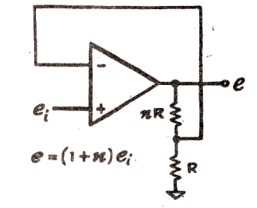
CONTROLLER (3-TERM)



$-\frac{e}{e_i} = \frac{1}{\alpha}\frac{R_2}{R_1}\left(1+\frac{1}{R_1C_1P}\right)\left(1+R_1C_1P\right)$

PROPORTIONAL INTEGRAL DERIVATIVE

FOLLOWER WITH GAIN (ELECTROMETER AMPLIFIER)



For information on any of the circuits shown here consult PHILBRICK or their representative nearest to you.

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