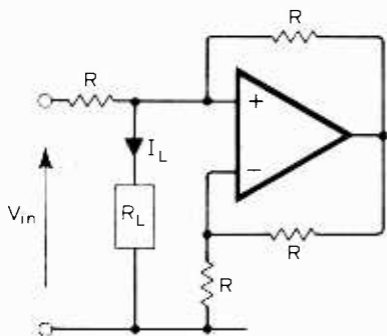


## Earth referenced V-to-I

The circuit idea for Earth referenced V-to-I which appeared in *Wireless World* December 1977, required one op-amp and three transistors. This simpler circuit uses one op-amp to produce a current source referenced to ground.



It can be shown that the load current  $I_L = V_{in}/R$ . If  $R_L$  is replaced by a capacitor, a ground referenced integrator is formed and the resulting voltage ramp may be taken via a buffer stage across  $C$  or alternatively from the output of the o-amp. For the last mentioned connection, the output ramp is modified to become

$$V_o = \frac{2}{CR} V_{in} dt$$

The maximum load resistance that may be used is  $\leq V_{OH}/2I_L$  where  $V_{OH}$  is the peak output of the op-amp before saturation commences.

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