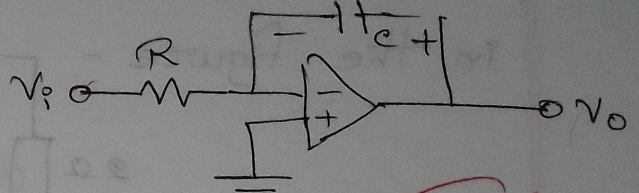


2018

4.c) A 10mV, 5 KHz sinusoidal signal is applied to the input of an OP-AMP integrator as shown below for which $R = 100k\Omega$ & $C = 1\mu F$. Find output voltage

Solⁿ:

We know,



$$V_{out} = -\frac{1}{RC} \int V_i(t) dt$$

$$= -\frac{1}{RC} \int V_o \sin \omega t dt$$

$$= -\frac{V_o}{RC} \left(-\frac{\cos \omega t}{\omega} \right) + C$$

$$= \frac{V_o \cos \omega t}{RC\omega}$$

$$= \frac{10 \times 10^{-3} \times \cos(2 \times \pi \times 5000 \times t)}{100 \times 10^3 \times 1 \times 10^{-6} \times 2 \times \pi \times 5 \times 10^3}$$

$$= 3.16 \times 10^{-6} \cos(31416 t) \text{ (Am)}$$

$$(4^{-1} + 12^{-1})^{-1}$$

$$= \frac{1}{\frac{1}{4} + \frac{1}{12}}$$

$$\begin{array}{r} 4 \overline{) 12.4} \\ 8 \\ \hline 4.4 \\ 4 \\ \hline 0.4 \end{array}$$