Chapter 6, Solution 12.

A voltage of $45e^{-2000t}$ V appears across a parallel combination of a 100-mF capacitor and a 12-Ω resistor. Calculate the power absorbed by the parallel combination.

Solution

$i_R = V/R = (45/12)e^{-2000t} = 3.75\ e^{-2000t}$ and $i_C = C(dv/dt) = 0.1x45(-2000)\ e^{-2000t} = -9000\ e^{-2000t}$ A. Thus, $i = i_R + i_C = -8{,}996.25e^{-2000t}$. The power is equal to:

$$vi = \mathbf{-40.48\ 179.925\ e^{-4000t}\ kW}.$$