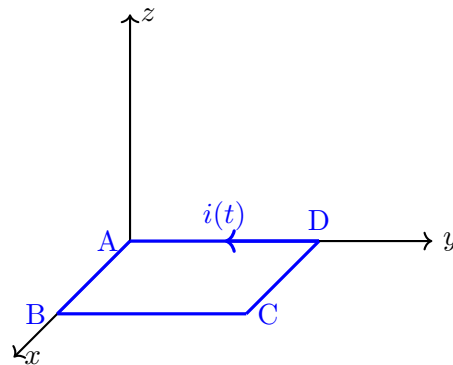


Learning Objective: Time Varying Field

Problem 1. Consider a rectangular loop ABCD on the $z = 0$ plane as shown in figure below. The loop is made of a conducting material with an internal resistance R_o . Suppose $AB = CD = a$ and $AD = BC = b$. Determine the current $i(t)$ if,



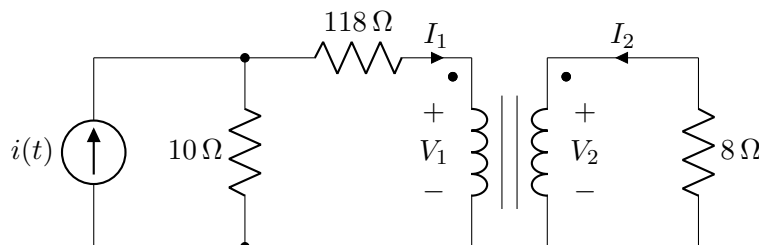
(a) $\mathbf{B} = B_o \cos(\omega_o t) \hat{\mathbf{z}}$.

(b) $\mathbf{B} = B_o \cos(\omega_o t) \hat{\mathbf{x}}$.

Problem 2. Consider a single-winded circular loop with a radius r_o is rotating in a static uniform magnetic flux density of B_o oriented in the direction perpendicular to the axis of rotation. Determine the angular velocity of the loop if the maximum induced voltage is V_o .

Learning Objective: Transformer

Problem 3. Consider the transformer circuit shown in the figure below, the current source supplies $i(t) = \cos(\omega_o t)$ A.



(a) Determine the turn ratio N_1/N_2 for maximum power transfer to the 8Ω resistor.

(b) Determine the secondary voltage V_2 .