

# Circuits II

EE221

Unit 9

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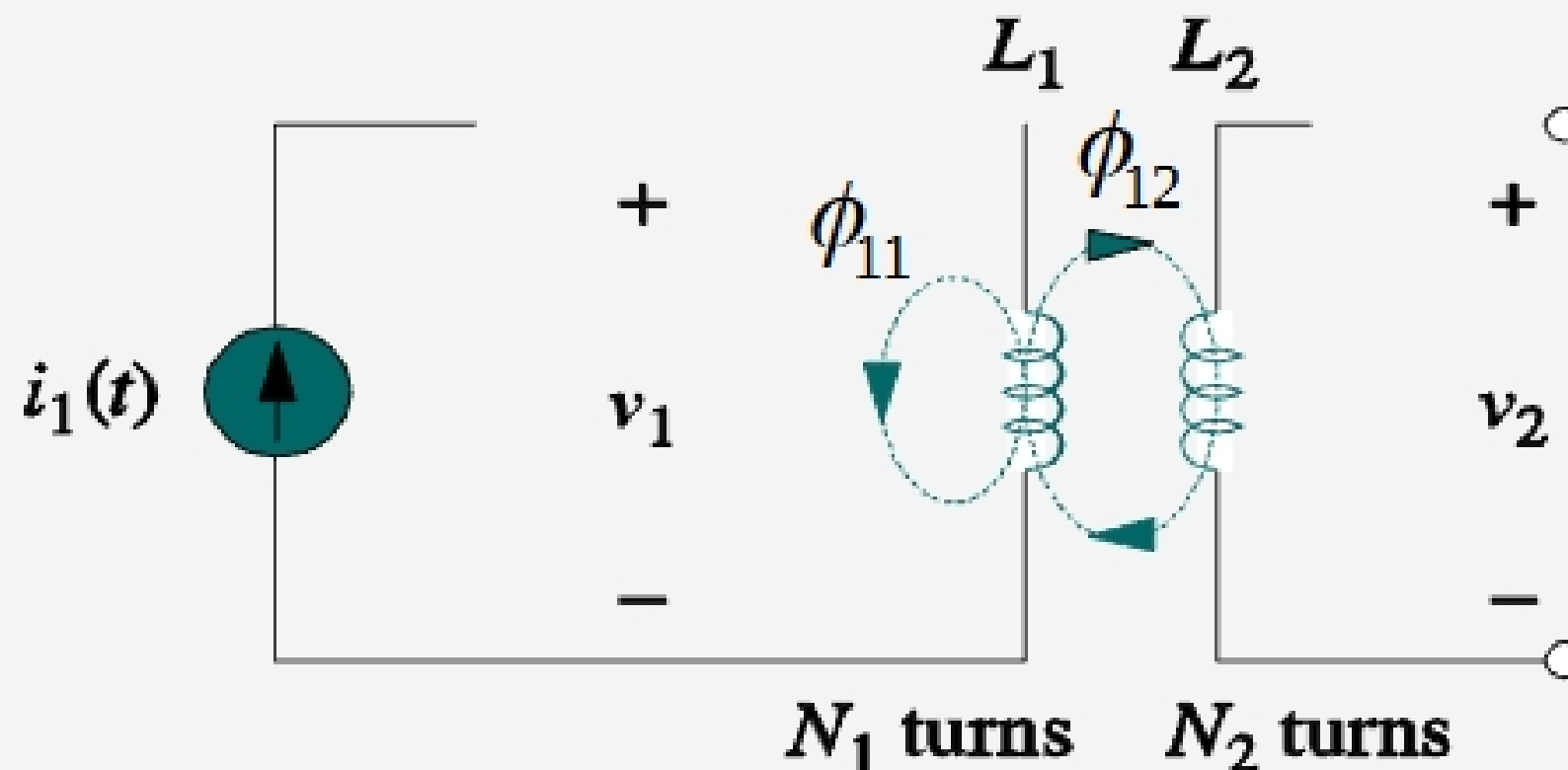
Mutual Inductance, Energy in  
Magnetically Coupled Circuits, Analysis  
of Mutual Inductance Circuits

# Mutual Inductance

Coils with current flowing in them emit magnetic energy that induce voltages in other coils in close proximity. The effects of the magnetic link between these circuits is called mutual inductance.

Show that current  $i_1$  in first coil induces voltage  $v_2$  in second coil of the form:

$$v_2 = M_{21} \frac{di_1}{dt} \quad \text{where} \quad M_{21} = N_2 \frac{d\phi_{12}}{di_1}$$



# Mutual Inductance Dot Convention

The geometry of the coil and flux paths are expressed in the dot convention below. This notation is important for applying circuit laws for analysis.

