

Circuits II

EE221

Unit 9

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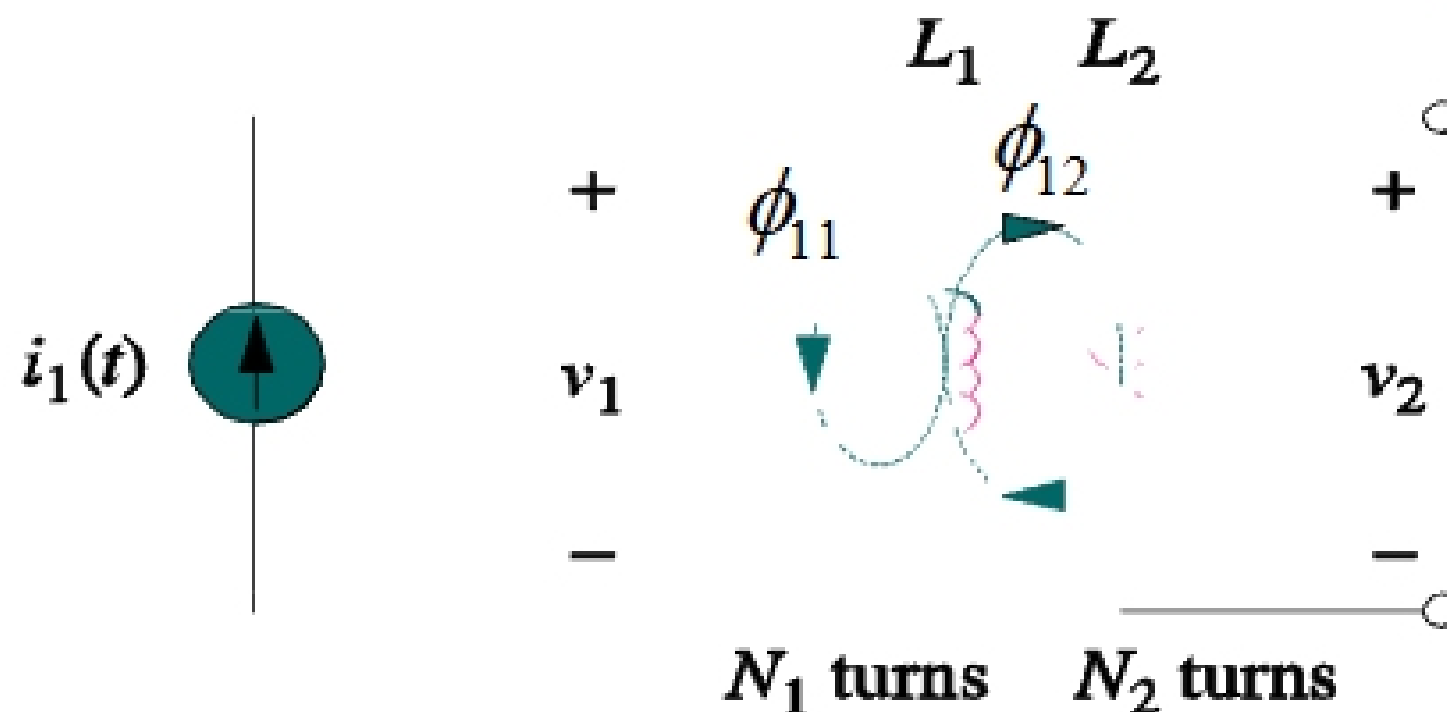
*Mutual Inductance, Energy in Magnetically
Coupled Circuits, Analysis of Mutual
Inductance Circuits*

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.

