MAGNETICALLY COUPLED

Firilia Filiana, S.T., M.T

ELEKTRO ITK

Institut Teknologi Kalimantan

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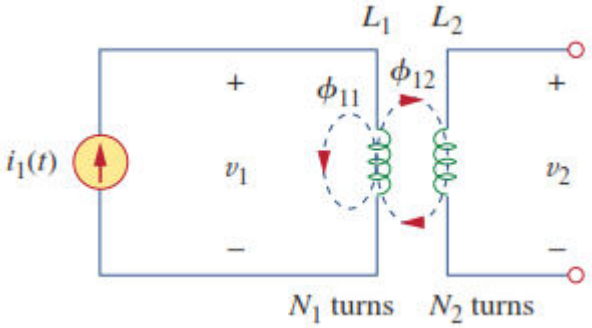
- When two loops with or without contact between them effect each other through the magnetic field generated by one of them.

- M -> The ability of one inductor to induce a voltage across a neighboring inductor, henrys (H)



$$\phi_1 = \phi_{11} + \phi_{12}$$

$$M_{12} = M_{21} = M$$

$$v_2 = M_{21}\frac{di_1}{dt}$$

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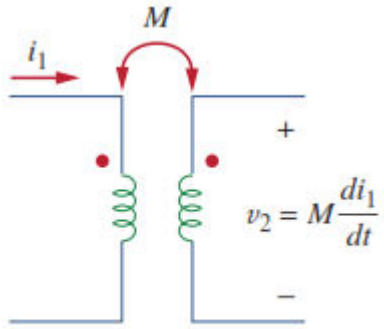
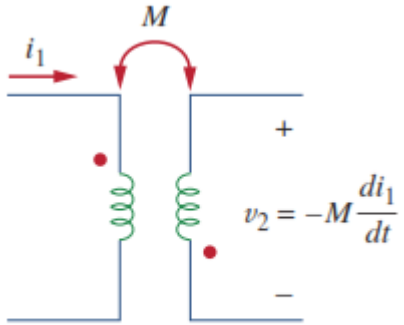
Dot convention

- If a current enters the dotted terminal of one coil, the reference polarity of the mutual voltage in the second coil is positive at the dotted terminal of the second coil.



(a)

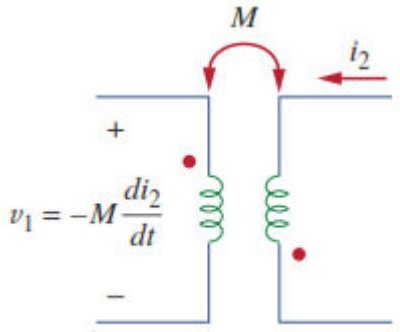


(b)

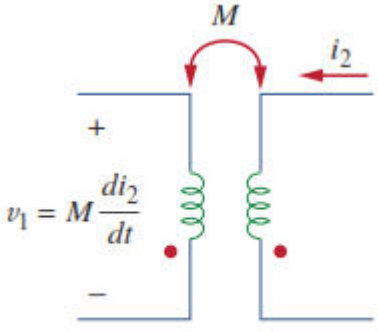
MAGNETICALLY COUPLED

Dot convention

- If a current leaves the dotted terminal of one coil, the refence polarity of the mutual voltage in the second coil is negative at the dotted terminal of the second coil



(c)



(d)

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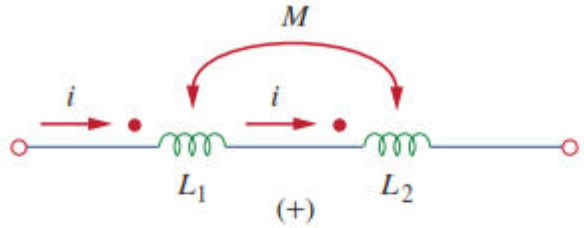
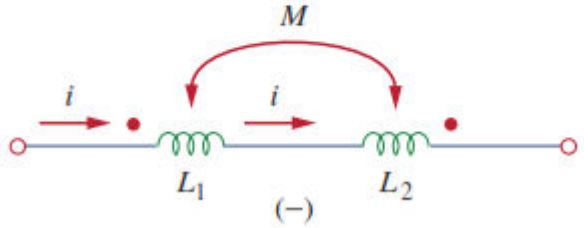


(a)



(b)

$$L = L_1 + L_2 + 2M \qquad \text{(Series-aiding connection)}$$

$$L = L_1 + L_2 - 2M \qquad \text{(Series-opposing connection)}$$

$$v_1 = i_1R_1 + L_1\frac{di_1}{dt} + M\frac{di_2}{dt} \qquad v_2 = i_2R_2 + L_2\frac{di_2}{dt} + M\frac{di_1}{dt}$$

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- Make a equation from Figure 1.

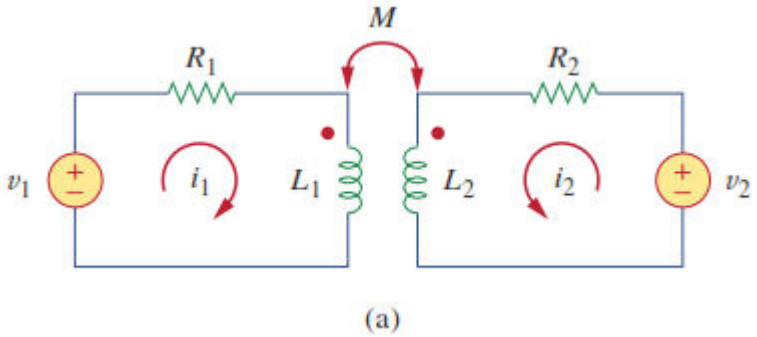

Figure 1. Electrical Circuit