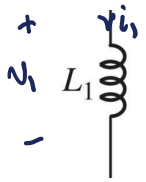
Energy Storage

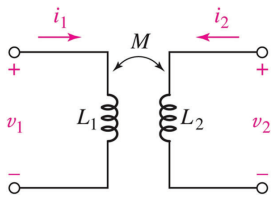


Inductor: if $i_1 = 0$ for $t < 0$, then goes to I_x @ t_x

$$E_x = \int_0^{t_x} p_L(\tau)\,d\tau = \int_0^{t_x} v_1(t)\,i_1(t)\,dt = \int_0^{t_x} L_1\,i_1(t)\,\frac{di_1(t)}{dt}\,dt$$

$$= L_1 \int_0^{t_x} \frac{1}{2}\left[\frac{d}{dt}\,i_1(t)^2\right] dt = \frac{1}{2}L_1\left[i_1(t)^2\right]\Big|_{0 = i_1(t=0)}^{I_x = i_1\,t=(t_x)}$$

$$= \frac{1}{2}L_1 I_x^2$$



Coupling Coefficient

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Transformers

Ideal Transformer

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Equivalent Circuits

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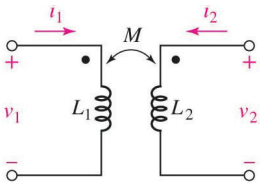
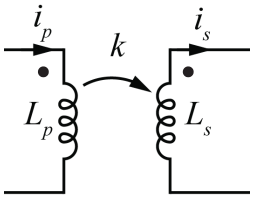
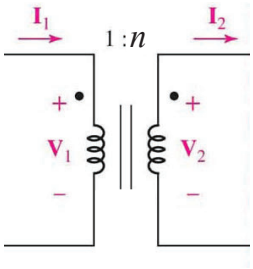
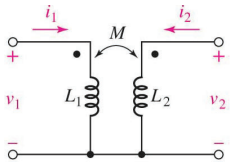
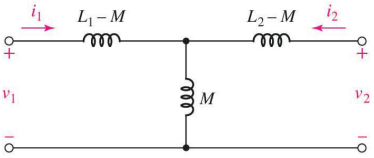
Equivalent Circuits

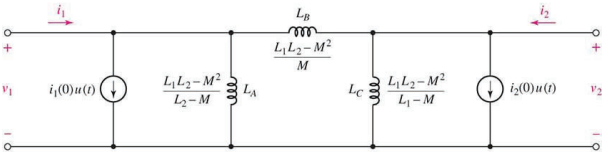












Transformer Reflection

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Applications of Coupled Inductors