Inductance, inductors, RL circuits and RLC circuits

Lecture 25

Announcements

- Reading for Monday: 29-5 to 29-6
- BTW: Final exam will have 2 problems each from
 - Clickers
 - Prelecture/Checkpoint
 - Previous exams
- MT3 will be returned Wednesday.

Review: Induction/Inductors



 $\mathcal{E} = -\frac{d\Phi_B}{dt} = -L\frac{dI}{dt} = -V_L$

New: RL circuits



(Reasoning) RL Circuits 1



(Reasoning) RL Circuits 1



RL Circuits: Detailed Analysis





• Results

RL Circuits: Detailed Analysis





Where is the energy stored?



Where is the energy stored?



RLC circuits

Lecture 25



LC Circuits: Detailed Analysis



$$KVL: \quad V_L(t) + V_C(t) = 0$$

$$0 = \frac{Q(t)}{C} + L \frac{d^2 Q(t)}{dt^2}$$

LC Circuits: Detailed Analysis



$$\omega = \sqrt{\frac{1}{LC}}$$

LC Circuits: Energy conservation



LRC Circuits

