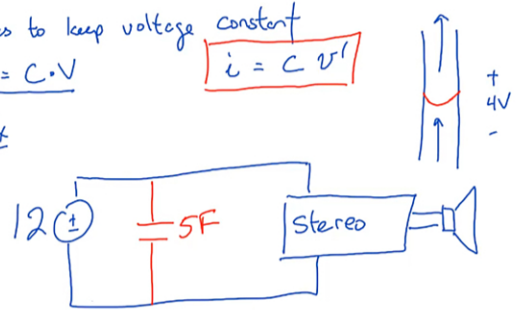
Capacitor

- Tries to keep voltage constant

$Q = C \cdot V$

$i = C V'$

Ex

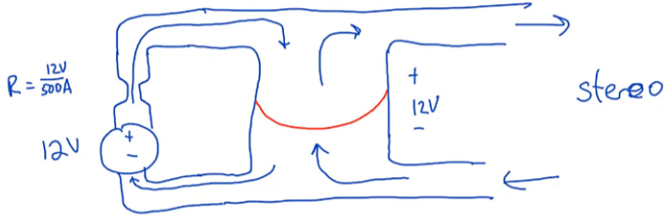


battery: 12V supply max 500A

but big bass thump (10ms) draws 1000A

what happens 12V can't supply, V drops, ☹

Soln Capacitor



Intuition

Math $Q = \int i(t)\,dt = (1000A)(10ms) = 10C$

$Q = CV = (5)(12) = 60C$

$$\Delta V_c = \frac{1}{C}\int_{t_0}^{t_1} i_c(\tau)\,d\tau$$

$$= \frac{1}{5}\int_0^{10m} 500\,d\tau$$

$$= 100\int_0^{10m} d\tau$$

$$= 100\,\tau\Big]_{\tau=0}^{10m}$$

$$= 1000m - 0$$

$$= 1V$$