R·I·T School of Mathematical Sciences

Kirchhoff's Law

MATH 211

1. Supoose that in a cimple circuit the resistance is 12 Ω and the inductance is 4 H. If the battery gives a constant voltage of 60 V and the switch is closed at $t =$ so the initial current is 0, find the current as a function of time.

2. Suppose that in a simple circuit the resistance is 12 Ω and the inductance is 4 H. If a battery gives a voltage of $E(t) = 60 \sin(30t)$ V and the switch is closed at $t = 0$ so the initial current is 0, find the current as a function of time.

3. In a simple circuit, a battery supplies a constant voltage of 40 V, the inductance is 2 H and the resistance is 10 Ω. If the initial current is 0, find the current as a function of time.

4. A circuit contains an electromotive force, a capacitor with capacitance of C farads and a resistor with resistance R ohms. The voltage drop across the capacitor is Q/C where Q is the charge (in coulombs). Suppose the resistance is 5 Ω, the capacitance is 0.05 F and a batter gives a constant voltage of 60 V. If the initial charge in the circuit is 0, find the charge and current as functions of time t.