

Answer on Question #54149-Physics-Electromagnetism

While deriving the Inductive reactance in a purely Inductive circuit, We come across an eqn. " $\mathcal{E} - L(di/dt) = 0$ " it is told that the resistance in the circuit is 0 as emf is zero. my Question is that then how can current flow in the circuit?

Answer

If the resistance is zero then for a current to flow there does not need to be a battery - the emf can be zero. No work is done as the current flows.

This may sound like a strange case, but it is how many strong magnets work in nmr (nuclear magnetic resonance) spectrometers. They have a 'loop' of superconducting 'wire' and no battery in the circuit. Magnetic inductance is used to start a current flowing in the loop. And the current keeps flowing in the loop forever.

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