

Electromagnetic Induction

Diagrams for <http://www.ivorcatt.co.uk/x29j.htm>

Dear Ionel,

I have written this for you.

<http://www.ivorcatt.co.uk/x29j.htm>

Faraday did not discover electromagnetic induction. He discovered crosstalk.

<http://www.ivorcatt.co.uk/x147.pdf>. My article mainly deals with crosstalk to a second pair of conductors open circuit at the front end. However, Figure 36 shows what happens as in a transformer, when the pair of wires in the secondary are shorted together at the front end. Still, some of the TEM Wave leaks out into the secondary.

The key point is that it is impossible for a TEM Wave to travel along down a pair of parallel conductors (e.g. transformer primary) and leave a second pair of parallel conductors (e.g. transformer secondary) unaffected. The conventional maths at the end of the article proves this, using classical theory

Ivor

Once you eliminate electricity, the whole process is elegant and simple.

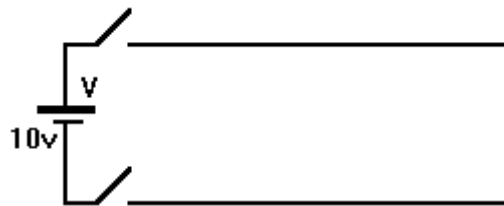


Figure 3

When you close the switches, the electromagnetic energy advances at the speed of light, guided by the two conductors. This is much as a train is guided by rails. The conductors, which are in fact extreme dielectrics, have a very low Z_0 impedance ("resistance") and a very high permittivity. So the velocity with which a small amount of the energy enters the conductors (sideways), $1/\sqrt{\mu\epsilon}$, is very slow. This is equivalent to the slight dent in the rails as a train passes.

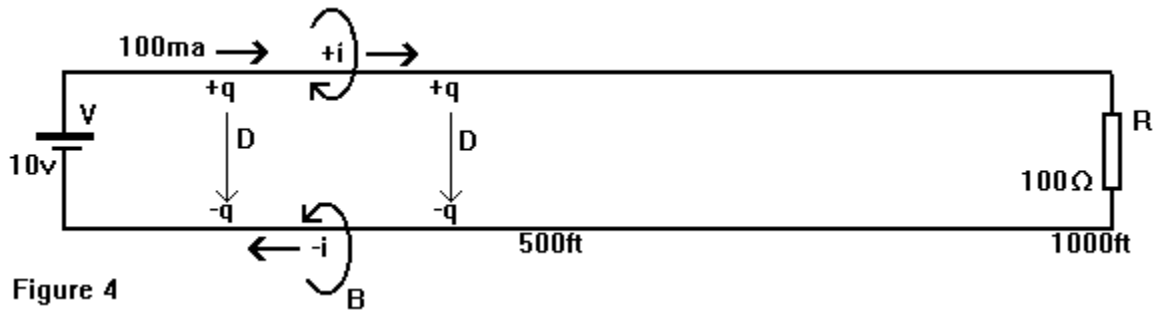


Figure 4



Figure 5

Ivor Catt 18 September 2012