

# The induced currents

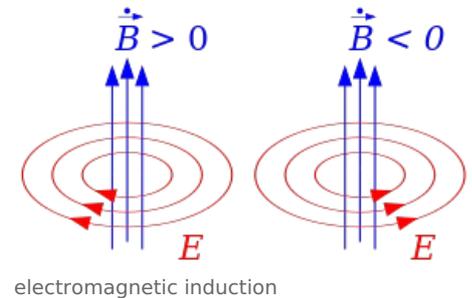
In the conductor, which contains free charge carriers and it is located in non-stationary magnetic field, an induced electric field is created and an electromotive voltage is induced (**Faraday's law**).

A current that flows through a conductor is called the induced current. Induced electric field creates vortices unlike an electrostatic field. It means that its lines of force make closed curves.

**Lenz's law:** Induced current works against change, which caused him. It always has that direction so that the change would be minimal in induction flux across the surface.

## A self induction

The magnetic field and magnetic induction flux is changed when a time-varying current passes through. There is an induced electromagnetic voltage in it. A change in magnetic induction flux is directly proportional to the change in current magnitude.



## A mutual induction

If a conductor is near to another conductor through which flows a time-varying current, it will be induced an electromagnetic field in it and it will flow an induced current.

## Effects

An electromagnetic voltage is induced in the tissue due to electromagnetic field. This causes the formation of time-varying electric field and induced currents. If a certain threshold value of voltage is exceeded, electromagnetic field will affect a voltage across the cell wall. The activity of cell receptors, ion channels and total cell activity will also be affected and changed by changes of electromagnetic field. Changes in the structure of proteins (enzymes, hormones...) causes a change in their function. They are responsible for inducing time-varying electric charges on the surface and inside the body, cell stimulation of neurons and muscle cells.

## Reference

- NAVRÁTIL, Leoš – ROSINA, Jozef. *Medicínská biofyzika*. 1. edition. Grada Publishing, 2005. 524 pp. ISBN 80-247-1152-4.