Programs for Calculation of Electromagnetic Fields in MRI

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Technology description

Background

Magnetic resonance imaging (MRI) is used as a noninvasive medical procedure to assist physicians in the diagnosis and treatment of medical conditions. MRI scanners generate strong magnetic fields, which may pose risks or problems to patients with certain implants or medical devices, such as cochlear implants and many permanent pacemakers.

Technology Summary

Researchers at Purdue University have developed several programs for the analysis of the interactions between medical implants and the electromagnetic fields generated by MRI machines and others. Written in MATLAB, these programs are capable of calculating the heating of wires by an external magnetic field, calculation of electric currents induced by gradients in the MRIs magnetic field, calculation of magnetic fields induced in a patient by an MRI, and calculation of heating an entire medical implant during an MRI procedure. These programs are as of yet without a user interface; input and output are done with MATLAB.

Application area

Medical/Health
Monitoring interactions between MRI and medical implants

Advantages

Increased patient safety
Calculates heating, electric currents, and magnetic field strength simultaneously

Institution

Purdue University

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