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Numerical Computation of Specific Absorption Rate and Induced Current for Workers Exposed to Static Magnetic Fields of MRI Scanners

Authors : Sherine Farrag

Abstract : Currently-used MRI scanners in Cairo City possess static magnetic field (SMF) that varies from 0.25 up to 3T. More than half of them possess SMF of 1.5T. The SMF of the magnet determine the diagnostic power of a scanner, but not worker's exposure profile. This research paper presents an approach for numerical computation of induced electric fields and SAR values by estimation of fringe static magnetic fields. Iso-gauss line of MR was mapped and a polynomial function of the 7th degree was generated and tested. Induced current field due to worker motion in the SMF and SAR values for organs and tissues have been calculated. Results illustrate that the computation tool used permits quick accurate MRI iso-gauss mapping and calculation of SAR values which can then be used for assessment of occupational exposure profile of MRI operators.

Keywords : MRI occupational exposure, MRI safety, induced current density, specific absorption rate, static magnetic fields
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