Abstracts

Analysis of Energy Coupling into Spheroidal Ferritic Implants for Hyperthermia Applications

P.G. Cottis, A.I. Melas and N.K. Uzunoglu. "Analysis of Energy Coupling into Spheroidal Ferritic Implants for Hyperthermia Applications." 1990 Transactions on Microwave Theory and Techniques 38.9 (Sep. 1990 [T-MTT] (Special Issue on Multifunction MMIC's and their System Applications)): 1259-1267.

The coupling of energy of RF power into lossy tissues using a needle-shaped ferromagnetic implant excited by an externally applied current loop is analyzed theoretically. The ferritic implant is assumed to be of prolate spheroidal shape, while the tissue medium is modeled as a lossy sphere. The electromagnetic fields inside the ferritic implant, the surroundhg lossy tissue, and the free space are appropriately expressed in terms of spherical or spheroidal wave functions. Application of the boundary conditions results in an infinite system of equations for the unknown field expansion coefficients. This system is truncated and solved and the electromagnetic field is computed numerically. Absorbed power density inside the implant and the surrounding medium is computed, and the efficiency of the present method in producing in-depth energy deposition is examined.

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