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The calculation of levitation force between axially polarized magnetic disks by calculating function
M. Braneshi, O. Zavalani and Y. Luga 1

In this article, the analytic expression of levitation force between axially polarized magnetic disks is given. This is achieved through calculating the function of levitation force between two uniformly charged coaxial ring-shaped disks. The calculating function can be studied or tabulated. By using approximate expressions, a rapid calculation can be performed. The presented expression is tested with the data from literature.

Theoretical analysis of the magnetization behavior as a function of the applied magnetic field in one domain thin film samples
B. Petkov and L.Vatzkitchev 13

A method for determining of the magnetization direction in thin one-domain films with uniaxial anisotropy in the film plane has been introduced. It is based on the Stoner–Wohlfarth model and propounds mathematical procedure, leading to polynomial representation in the angle of magnetization. Bearing in mind that the analytical methods are rather cumbrous than handy, the proposed method could be useful with its good numerical correctness and its clear relation with the physical behavior of the system. Propositions about extensions of the method for more complicated cases are made.

Numerical investigation of impedance variation of a microstrip patch antenna with feed position
T. Samaras, A. Kouloglou and J.N. Sahalos 20

The dependence of the impedance of a rectangular patch antenna on the feed position was studied in the present work. The antenna was fed either by a microstrip line or by a coaxial probe. Both configurations were analysed with a finite-difference time-domain (FDTD) code implemented in a commercially available simulation platform. Numerical results were then compared with measurements that had been published in other studies and with the theoretical impedance variation assumed in the literature. It was shown that the numerical results are in good agreement with measurements, if (a) the real dielectric properties, including losses, are accounted for in the calculations, and (b) sufficiently fine resolution is used. It was also shown that the dependence of the impedance does not follow a cosine-squared variation, when the patch is fed by a microstrip line, but a cosine raised to the forth power.

A New Method Evaluation of the EFIE Integral for the Two-Dimensional Dirichlet Problem
Alexander G. Tyzhnenko **30**

A new method of direct integration (DIM) is proposed for evaluating integrals with integrable singularity. This method is applied for solving for 2-D E-scattering from metallic cylinders both for resonant and non-resonant cases. The Galerkin MoM with DIM is considered and compared to that of with singularity extraction approach. Applying DIM, a stable and effective solution to electric field integral equation (EFIE) is obtained for any scatterer configurations including thin elongated structures. A combined field integral equation (CFIE) is also considered with DIM. Making use of DIM and vectorized filling of MoM matrix in the MATLAB programming area, a high effective MoM solution to CFIE is obtained.

Electromagnetic fields generated by a dipole antenna implanted inside biological tissue
Christos Marmalidis **46**

In this article a canonical problem of radiation of an infinite dipole antenna placed inside a tissue medium is analyzed by using a semi-analytical approach. A Fourier analysis is pursued to solve analytically the boundary value while numerical integration algorithm are utilized to compute the electrical fields inside the tissue medium. Interesting results clarifying the power deposition mechanisms inside the tissue media are observed.

Chaotic oscillations in ferroresonance circuits
Evelin Tsonev and Ivan Simeonov **66**

The paper presents a continuous wavelet analysis as an approach to the understanding of solutions the nonlinear equations of Duffing type. The wavelet transformation has been used for local analysis of ferroresonance system's behavior. Some of Wavelet Toolbox Matlab properties have been demonstrated.