Abstracts

A model for discretization error in electromagnetic analysis of capacitors

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The error due to discretization in a method-of-moments analysis of a parallel plate or metal-insulator-metal (MIM) capacitor is discussed. A technique related to Richardson extrapolation is used to develop a model for the error due to subsectional discretization. The results are for Galerkin's method using rooftop basis functions; however, the technique can be applied to any variational moment-method calculation. An expression is presented for the error in capacitance calculations, which is shown to hold for changes in geometry and dielectric constant. In addition, the expression for error is shown to be accurate for a wide range of meshing geometries. Surprisingly, the error model is not an upper bound, but rather is met nearly in equality for all geometries considered. Thus, the error may be simply subtracted from the calculated value for a more accurate result.

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