# Visual ElectroMagnetics (VEM): A Visualization Tool to Enhance Learning in Undergraduate Electromagnetics

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ABSTRACT:
Visual ElectroMagnetics (VEM) is a 2-D static electromagnetic simulator designed as a visualization aid for students in undergraduate electromagnetic courses. VEM utilizes finite difference techniques in electrostatic, conductive, and magnetostatic environments. The VEM code, written in MATLAB for Windows 95/98, provides an inexpensive, user-friendly graphical interface that is platform independent. VEM consists of a structure window in which the user enters electromagnetic materials and sources via common drawing tools and pop-up menus. The solver button generates the system matrix, solves it, and activates the solutions window in which the results are displayed in a variety of user-selected viewing modes. Though the solution region is finite in extent, a compact simulation of the open boundaries of infinite extent is achieved via the Transparent Grid Termination (TGT). Preliminary evaluations of the enhancement of student learning by VEM are promising. A full demonstration of VEM will be included in the presentation.

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