1004-65-18   **Aihua W Wood*** (`aihua.wood@afit.edu`), 2950 Hobson Way, AFIT/ENC, WPAFB, OH 45433, and **Junqi Huang**, Air Force Institue of Technology, 2950 Hobson Way, WPAFB, OH 45433. *A finite element method for the solution of an electromagnetic scattering problem.* Preliminary report.

The analysis of the electromagnetic scattering properties of cavities in a conducting ground plane is of high interest to the engineering community.

We seek to determine the fields scattered by a protruding cavity upon a given incident wave. Our method decomposes the entire solution domain to two sub-domains via an artificial semicircle enclosing the cavity: the infinite upper half plane over the perfect electrically conducting (PEC) ground plane exterior to the semicircle, and the cavity plus the interior region. The problem is solved exactly in the infinite sub-domain, while the other is solved using finite elements. The two regions are coupled over the semicircle via the introduction of a boundary operator exploiting the field continuity over material interfaces.

Our method is implemented by a finite element method (FEM) supported under the GUI environment of Matlab. Our numerical results compare well with known results. In addition, convergence of the method is investigated, providing a reference for mesh refinement and specific error tolerance. (Received December 13, 2004)

1