calculated using series expansions. Therefore, the angular integral can be computed by summing a series instead of applying a standard numerical integration algorithm. This new technique is found to be more accurate and efficient when piecewise-sinusoidal basis functions are used to analyze a printed strip dipole antenna in a layered medium. The incomplete Lipschitz–Hankel integral representation for the angular integral is then used in another paper to develop a novel asymptotic extraction technique for the outer semi-infinite integral.

AN ALGORITHM FOR THE SOLUTION OF INVERSE LAPLACE PROBLEMS AND ITS APPLICATION IN FLAW IDENTIFICATION IN MATERIALS. Shuvra Das and Ambar K. Mitra, *Department of Engineering Science and Mechanics, Iowa State University, Ames, Iowa 50011, U.S.A.*

An algorithm for solving an inverse problem in steady state heat conduction is developed. In this problem, the location and shape of the inner boundary of a doubly connected domain is unknown. Instead, additional experimental data are provided at several points on the outer boundary. Through an iterative process, the unknown boundary is determined by minimizing a functional. Convergence properties of the algorithm are examined, and the stopping criterion for the iterative process is developed from numerical experiments in a simple case. The scheme is shown to perform well for the complex case of an *L*-shaped crack in a square domain.

THE ASYMPTOTIC DIFFUSION LIMIT OF A LINEAR DISCONTINUOUS DISCRETIZATION OF A TWO-DIMENSIONAL LINEAR TRANSPORT EQUATION. C. Borgers, *Department of Mathematics, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.*; Edward W. Larsen, *Department of Nuclear Engineering, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.*; Marvin L. Adams, *Lawrence Livermore National Laboratory, University of California, Livermore, California 94550, U.S.A.*

Consider a linear transport problem, and let the mean free path and the absorption cross section be of size ε. It is well known that one obtains a diffusion problem as ε tends to zero. We discretize the transport problem on a fixed mesh, independent of ε, consider again the limit $\varepsilon \to 0$, and ask whether one obtains an accurate discretization of the continuous diffusion problem. The answer is known to be affirmative for the linear discontinuous Galerkin finite element discretization in one space dimension. In this paper, we ask whether the same result holds in two space dimensions. We consider a linear discontinuous discretization based on rectangular meshes. Our main result is that the asymptotic limit of this discrete problem is *not* a discretization of the asymptotic limit of the continuous problem, and thus that the discretization will be inaccurate in the asymptotic regime under consideration. We also propose a modified scheme which has the correct asymptotic behavior for spatially periodic problems, although not always for problems with boundaries. We present numerical results confirming our formal asymptotic analysis.

NOTE TO APPEAR

PARAMETRIZED SOLUTION OF ONE-DIMENSIONAL THERMAL DIFFUSION WITH A HEAT SOURCE AND A MOVING BOUNDARY. Edward J. Caramana and Robert B. Webster, *Los Alamos National Laboratory, Los Alamos, New Mexico 87545, U.S.A.*

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