ON THE NUMERICAL SOLUTION OF SOME SEMILINEAR ELLIPTIC PROBLEMS[*]

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Abstract. We discuss a general framework for the numerical solution of a family of semilinear elliptic problems whose leading differential operator is the Laplacian. A problem is first transformed to one on a standard domain via a conformal mapping. The boundary value problem on the standard domain is then reduced to an equivalent integral operator equation. We employ the Galerkin method to solve the integral operator equation, using the eigenfunctions of the Laplacian on the standard domain. An error analysis of the method is given.

Key words. elliptic, nonlinear, integral equation, Galerkin method.

AMS subject classifications. 65R20, 65N99, 35J65.