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Section:

15. Numerical Analysis and Scientific Computing

1991 MS Classification: 45, 65

Pedas, Arvet, Tartu University, Estonia:

Collocation method for weakly singular integral equations.

We consider a nonlinear equation $u(x) = \int_G K(x, y, u(y)dy + f(x)$, $x \in G$, where $G \subset I\!R^n$ is a bounded set, $f : G \to I\!R$ is a smooth function and $K: G \times G \times I\!R \to I\!R$ is for $x \neq y$ a smooth function which may have a weak singularity at $x = y$. A collocation method will be presented which is adapted to the singularities of the solution of the integral equation. Using special collocation points, error estimates at the collocation points will be derived showing a more rapid convergence than the global uniform convergence in G available by piecewise polynomials. Part of these results is joint work with G. Vainikko.

Reference: A. Pedas and G. Vainikko, Superconvergence of piecewise polynomial collocations for nonlinear weakly singular integral equations, *J. Integral Equations Appl.*, **9** (1997), No. 4, 379–406.