

# The singular function boundary integral method for biharmonic problems

Miltiades Elliotis and Georgios Georgiou

*Department of Mathematics and Statistics  
University of Cyprus  
P.O. Box 20537, 1678 Nicosia, Cyprus*

## Abstract

We propose a singular function boundary integral method for biharmonic problems with boundary singularities. The leading terms of the local solution expansion are used to approximate the solution and to weight the biharmonic equation. The discretized equations are reduced to boundary integrals by means of Green's theorem, and the essential boundary conditions are weakly enforced with Lagrange multipliers. The method is applied to the stick-slip problem, a two-dimensional Stokes flow problem with a boundary stress singularity. The convergence of the method with the number of singular functions and the number of Lagrange multipliers is studied and accurate estimates of the leading singular coefficients are obtained.