

1014-65-797

Bjorn Engquist, TX, **Anna-Karin Tornberg**, NY, and **Richard Tsai***
(ytsai@math.utexas.edu), 2515 Speedway, RLM 8.100, Austin, TX 78712. *Discretization of Dirac Delta Functions in Level Set Methods.*

Discretization of singular functions is an important component in many problems to which level set methods have been applied. We present two methods for constructing consistent approximations to Dirac delta measures concentrated on piecewise smooth curves or surfaces. Both methods are designed to be convenient for level set simulations and are introduced to replace the commonly used but inconsistent regularization technique that is solely based on a regularization parameter proportional to the mesh size. The first algorithm is based on a tensor product of regularized one-dimensional delta functions. It is independent of the irregularity relative to the grid. In the second method, the regularization is constructed from a one-dimensional regularization that is extended to multi-dimensions with a variable support depending on the orientation of the singularity relative to the computational grid. Convergence analysis and numerical results are given. (Received September 24, 2005)