

# Discrete thin plate splines

*\*L. Stals, S. Roberts*

Australian National University, Canberra, Australia

Traditional thin plate splines use radial basis functions and require the solution of a dense linear system of equations whose size increases with the number of data points. We present a discrete thin-plate spline method that uses polynomials with local support defined on finite-element grids. The resulting system of equations is sparse and its size depends only on the number of nodes in the finite element grid so this method is efficient when dealing with large data sets. Theory is developed for general  $d$ -dimensional data sets and model problems are presented in 3D to study the convergence behaviour.