

1093-65-300

Quan Deng, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716,
and **Tobin A. Driscoll*** (driscoll@udel.edu), Department of Mathematical Sciences,
University of Delaware, Newark, DE 19716. *Fast adaptive multiquadric interpolation.*

Multiquadric (MQ) radial basis functions are a popular choice for meshfree interpolation and the solution of PDEs. They provide highly accurate approximations that use degrees of freedom efficiently. However, MQ interpolation leads to dense and potentially ill-conditioned linear algebra problems. Previous work has shown that residual-based adaptation of the nodes and shape parameters can control the conditioning. Pairing this strategy with a treecode for fast forward evaluation and an embarrassingly parallel restricted additive Schwarz preconditioner allows the solution on n nodes to be done in nearly $O(n \log n)$ time on typical cases. (Received August 19, 2013)