

# Adaptive Wavelet methods for the Hilbert transform and Riemann-Hilbert problems

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The Hilbert transform plays an important role in signal theory and computational complex analysis. A serious problem in some of these algorithms is the *crowding* phenomenon, which occurs for example in numerical conformal mapping and, more generally, in methods for solving nonlinear Riemann-Hilbert problems.

In order to overcome these difficulties we develop an approach for computing the Hilbert transform on a non-uniform mesh using biorthogonal B-Spline wavelets. Furthermore, we propose an adaptive method for the numerical solution of Riemann-Hilbert problems involving the Hilbert transform on graded meshes and give some modifications of former algorithms which show better convergence behavior.

The talk is based on a joint work with Prof. E. Wegert.