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A Haar-type Approximation and a New Numerical Schema for the Korteweg-de Vries Equation

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(Submitted on 18 Jul 2011)

We discuss a new numerical schema for solving the initial value problem for the Korteweg-de Vries equation for large times. Our approach is based upon the Inverse Scattering Transform that reduces the problem to calculating the reflection coefficient of the corresponding Schr\"odinger equation. Using a step-like approximation of the initial profile and a fragmentation principle for the scattering data, we obtain an explicit recursion formula for computing the reflection coefficient, yielding a high resolution KdV solver. We also discuss some generalizations of this algorithm and how it might be improved by using Haar and other wavelets.

Subjects:	**Spectral Theory (math.SP)**; Numerical Analysis (math.NA)
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