

Department of Mathematics and Statistics
Colloquium Lecture Series

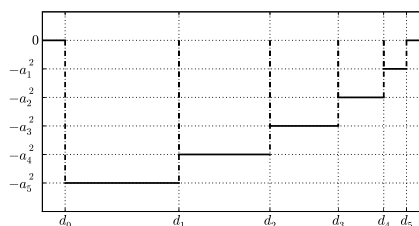
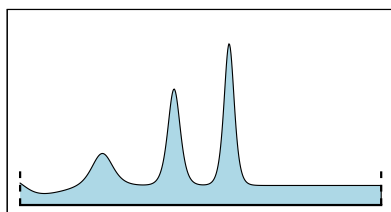
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A Hybrid Numerical Method for Block-Type Initial Profiles for the Kdv Equation

The famous KdV (Korteweg–de Vries) equation

$$u_t - 6uu_x + u_{xxx} = 0$$

describes water waves in a shallow, narrow long canal:



It is one of the “simplest” nonlinear partial differential equations; nonetheless, before 1967 only two types of solutions of KdV on the whole real line were known: solitons and cnoidal waves. After the invention of the *inverse scattering transform* it became possible to consider Cauchy problems for KdV with initial states with a rather mild restrictions: fast enough decay at infinity (initial profile from the *Faddeev class*).

In this work, block-type initial profiles are considered and a hybrid numerical method— a combination of a conventional numerical method for small times and asymptotic results obtained with the help of the IST for large times is proposed.

Results in two simple cases are described and discussed, together with problems at hand and challenges that implementing this method for the case of an arbitrary number of blocks would present.

Tuesday, August 5, 2008
Chapman 106
1:00 – 2:00 pm

Refreshments after the talk in Chapman 101A