

Generalized Dirichlet-to-Neumann Map for the KdV equation on a finite interval

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We study the initial-boundary value problem for the KdV equation posed on a bounded interval of the spatial variable. Integrating along the boundary of the domain in simultaneously the two equations constituting the associated Lax pair, we formulate a global relation that involves algebraically certain functions of the spectral parameter, called the spectral functions. Using a Gelfand-Levitan-Marchenko representation of the spectral functions associated to the temporal variable, we are able to give an explicit characterization of the so-called generalized Dirichlet-to-Neumann map, that is, solve the global relation for the missing boundary values in terms of the known ones.