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On arbitrary-precision enabled inverse scattering for the 1-dimensional Schrödinger operator

There is renewed interest in singularity dynamics of integrable systems in the complex x-plane. This was originally studied by Kruskal, Kruskal and Thickstun, and Bona and Weissler and more recently by Weideman and Ankiewicz, Clarkson and Akhmediev. One approach to study this is to perform numerical analytic continuation of the solution for real x. This motivates us to study methods to approximate solutions of the Korteweg-de Vries equation with high precision. As a first step, we consider the small time evaluation of a very special class of solutions by solving Riemann–Hilbert problems (i.e., singular integral equations) with arbitrary precision.