

1167-81-258

**Ramazan Ercan\*** (ramazan.ercan@mavs.uta.edu), 728 Kroeber walk Apt 102, Goleta, CA 93117, and **Tuncay Aktosun**. *Direct and inverse scattering problems for the first-order discrete system associated with the derivative NLS system.*

The direct and inverse scattering problems are analyzed for a first-order discrete system associated with the semi-discrete version of the derivative NLS system. The scattering data set consisting of the scattering coefficients and bound-state data is investigated and related to the corresponding quantities for two other particular discrete linear systems. The bound-state data set is described in terms of two constant matrix triplets, which allows to handle bound states with any number of multiplicities in a systematic and elegant manner. The direct scattering problem is solved by determining the scattering coefficients and the bound-state information consisting of bound-state energies, their multiplicities, and the corresponding norming constants when the potentials are given. To solve the inverse problem of recovery of the potentials from the scattering data, a Marchenko method is introduced. This Marchenko method seems to be generalizable to some other first-order systems both in the discrete and continuous cases for which a Marchenko system is not yet available. Several methods are presented to solve the corresponding inverse problem. (Received March 08, 2021)