

# Inverse scattering transform for the integrable discrete nonlinear Schrödinger equation with non-vanishing boundary conditions

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The inverse scattering transform for an integrable discretization of the defocusing nonlinear Schrödinger (IDNLS) equation with non-vanishing boundary values at infinity is constructed. This problem was previously studied and many important results were established. In this talk, a suitable transformation of the scattering problem is introduced in order to address the open issue of analyticity of eigenfunctions and scattering data. Moreover, the inverse problem is formulated as a Riemann-Hilbert problem on the unit circle, and a modification of the standard procedure is required in order to deal with the dependence of asymptotics of the eigenfunctions on the potentials. Finally, soliton solutions and small amplitude limit solutions are obtained.

## References

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