1014-34-1515   **Gino Biondini*** (`biondini@buffalo.edu`), SUNY, Buffalo, NY 14260, and **Athanassios Fokas**.
Initial-boundary-value problems for linear and nonlinear differential-difference evolution equations. Preliminary report.

We present a method to solve initial-boundary-value problems for linear and nonlinear differential-difference evolution equations. The method is similar to the recently developed transform technique to solve initial-boundary-value problems for linear and nonlinear partial differential equations, and it provides a realization of the Ehrenpreis principle for initial-boundary-value problems of differential-difference equations. The method, which is based on a formulation of the differential equations as the compatibility condition of two associated linear problems, makes it possible to prove statements of existence and uniqueness, compute long-time asymptotics of solutions, and identify linearizable boundary conditions for nonlinear equations. Specific examples that will be discussed include the linear and nonlinear discrete nonlinear Schroedinger equation and discrete analogues of the linear and nonlinear Korteveg-de Vries equation. (Received September 28, 2005)

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