999-34-76 **Robert Carlson\*** (`carlson@math.uccs.edu`), Department of Mathematics, University of Colorado at Colorado Springs, 1420 Austin Bluffs Parkway, Colorado Springs, CO 80933. *A Spectral Transform for the Matrix Hill's Equation.*

Inverse spectral problems are considered for the matrix Hill's equation

$$-Y'' + Q(x)Y = \lambda Y, \quad Q(x+1) = Q(x),$$

$$Y(x, \lambda) \in C^K, \quad Q(x) \in M_K.$$

For matrix functions $Q$ with square integrable components, the map from $Q$ to the Floquet matrix of Hill's equation is described with the aid of a Paley-Wiener Hilbert space of entire functions. Local diffeomorphism results and applications to conventional inverse problems will be described. (Received August 09, 2004)