962-14-1399 **Martin Hassner*** (hassner@almaden.ibm.com), IBM Almaden Research Center, 650 Harry Rd., Almaden, CA 95120, and **Barry M Trager** (bmt@us.ibm.com), IBM T.J. Watson Research Center, P.O.Box 218, Yorktown Heights, NY 10598. *Riemann Surface Calculation of Nonlinear Electrical Filters.* Preliminary report.

We solve an Inverse Spectral Problem defined on an elliptic Riemann surface. For a given sum of two elliptic integrals of the third kind, which is used as a spectral measure, we calculate a nonlinear finite difference operator which can be realized by electronic components. This spectral measure appears as the magnetostatic potential of a magnetic signal read sensor. The practical application of such filters, matched to a potential function defined on the elliptic Riemann surface, is the decomposition of arbitrary sums of shifted magnetostatic potentials into elementary components. Furthermore, if these sums are constrained, these filters generate phase shifts that allow to check the imposed constraint. The voltages and currents measured in the electronic circuit which realizes the nonlinear finite difference equation are the scattering data for an inverse spectral transform that reconstructs the input potential function. (Received October 03, 2000)