

1135-34-1620

Kenneth T.-R. McLaughlin, Robert Jenkins and Kyle Pounder*

(kpounder@math.arizona.edu), Department of Mathematics, University of Arizona, 617 N Santa Rita Ave, Tucson, AZ 85721. *Nearly singular Jacobi matrices and applications to the finite Toda lattice.*

In this talk, we consider a singular limit for the inverse spectral problem for Jacobi matrices. The main results of the analysis are quite general estimates for the entries of a Jacobi matrix under certain assumptions about the relative sizes of the weights (norming constants). We apply these estimates to provide a detailed long time asymptotic analysis of the finite Toda lattice. The formulas we obtain improve upon the classical results of Moser by giving precise estimates of the associated error. Moreover, the Riemann-Hilbert techniques allow one, if they should so desire, to compute the complete asymptotic expansions for the various dynamical quantities. Finally, we apply our general estimates to study the time evolution of nearly singular Jacobi matrices under the Toda flow. (Received September 23, 2017)