

**Meeting:** 1003, Atlanta, Georgia, SS 38A, AMS-SIAM Special Session on Orthogonal Polynomials—Random Matrices—Integrable Systems: Interdisciplinary Aspects, I

1003-34-1029      **John Harnad\*** ([harnad@crm.umontreal.ca](mailto:harnad@crm.umontreal.ca)), Centre de recherches mathématiques, Université de Montréal, C.P. 6128, succursale "centre -ville", Montréal, Québec H3C 3J7, Canada. *Semiclassical orthogonal polynomials, matrix models and isomonodromic tau functions.*

Orthogonal polynomials with respect to arbitrary semiclassical measures supported on contours in the complex plane, together with "second kind" solutions of the associated recursion relations are considered, together with the compatible systems of deformation equations obtained from varying such measures. These are shown to preserve the generalized monodromy of an associated sequence of rank-2 rational covariant derivative operators. The associated isomonodromic tau functions are shown to coincide with the partition functions for corresponding matrix models, consisting of unitarily diagonalizable matrices with spectra supported on these contours. It is shown that all coefficients of the associated hyperelliptic spectral curves are given by logarithmic derivatives of the partition function or, more generally, of the gap probabilities. (Received October 02, 2004)