Meeting: 1000, Albuquerque, New Mexico, SS 1A, Special Session on Random Matrix Theory and Growth Processes

1000-60-50 **Craig A. Tracy** and **Harold Widom***, Department of Mathematics, University of California, Santa Cruz, CA 95064. *Differential Equations for Dyson Processes.*

By a *Dyson process* we mean any process on ensembles of matrices in which the entries undergo diffusion. In the original Dyson process, which we call the *Hermite process*, it was the ensemble of $n \times n$ Hermitian matrices, and the eigenvalues describe n curves. Similarly, when the entries of a complex matrix undergo diffusion we call the evolution of its singular values the *Laguerre process*. Scaling the Hermite process at the edge leads to the *Airy process* (which was introduced by Prähofer and Spohn as the limiting stationary process for a polynuclear growth model) and in the bulk to the *sine process*; scaling the Laguerre process at the edge leads to the *Bessel process*. We assume that sets $X_1, \ldots, X_m$ are finite unions of intervals and find for the Airy process a system of partial differential equations, with the end-points of the intervals of the X_k as independent variables, whose solution determines the probability that for each k no curve passes through X_k at time τ_k. We also find the analogous systems for the Hermite, sine, and Bessel process. (Adler and van Moerbeke have found PDEs of a different nature for the Hermite, Airy, and sine processes in the case m=2.) (Received August 06, 2004)