1077-60-1169 **Marco Bertola*** (bertola@mathstat.concordia.ca), 1455 de Maisonneuve St. W, Montreal, QC H3G 1M8, Canada, and **Mattia Cafasso** (cafasso@math.univ-angers.fr), H3G 1M8 Angers, France. *The Riemann–Hilbert approach to the gap probabilities in multi-time random point processes of Airy and Pearcey type.*

In the general framework of random determinantal point processes the main object of interest are the "gap probabilities", namely, the probability that no particles are found in subsets of the configuration space at certain times. It is a common denominator that these probabilities are expressed in terms of Fredholm determinants of matrix-valued kernels. A general theory developed in the nineties by Its, Izergin, Korepin and Slavnov shows how to naturally associate a Riemann-Hilbert problem to the construction of the resolvent operator of the kernel, which is used then to derive variational formulas for the determinant (probabilities) using Jacobi formula, and ultimately derive a set of ODEs or PDEs in the relevant parameters. The theory only applies to kernel of a special form, which is not the one in which the Pearcey and Airy kernels (scaling limits of the Dyson process, i.e. random eigenvalues of matrices undergoing Brownian diffusion) are presented. We show how this can nevertheless be accomplished, paving the way to the use of methods like the nonlinear steepest descent method of Deift and Zhou to analyze asymptotic behaviors of these determinants.

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