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**Igor Rumanov\*** ([igorrumanov@math.ucdavis.edu](mailto:igorrumanov@math.ucdavis.edu)), 1 Shields Avenue, Davis, CA 95616. *The correspondence between different approaches to derivation of PDE for random matrix gap probabilities and orthogonal functions.*

Two approaches (by Tracy-Widom and by Adler-Shiota-van Moerbeke) to derivation of integrable differential equations for random matrix probabilities are compared. Both methods are rewritten in such a form that simple and explicit relations between all TW dependent variables and  $\tau$ -functions of ASvM are found, for the example of finite size Gaussian matrices. Orthogonal function systems and Toda lattice are seen as the core structure of both approaches and their relationship. Some generalizations for all orthogonal polynomial ensembles will be presented. (Received September 01, 2008)