

A Statistical Physics Approach to the Sine Beta Process and Other Random Point Processes

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The Sine process (corresponding to inverse temperature beta equal to 2) is an ubiquitous determinantal point process. It appears as the bulk limit of many particle systems in various contexts (random matrix ensembles, zeros of L-functions, growth models etc.) Its universality properties are fascinating. There is also a whole family of Sine beta processes, introduced by Valko and Virag, as the bulk limit of Gaussian beta ensembles, for any positive beta. As soon as beta is different from 2, much less is known. I will explain how tools from classical statistical mechanics such as Dobrushin-Lanford-Ruelle (DLR) can be used to better understand their structure. This will be based on a joint work with David Dereudre, Adrien Hardy (Université de Lille), and Thomas Leblé (Université Paris Cité) but I will also review other - more recent - applications.

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