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Asymptotics of Plancherel measures for the infinite-dimensional unitary group

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Abstract

We study a two-dimensional family of probability measures on infinite Gelfand–Tsetlin schemes induced by a distinguished family of extreme characters of the infinite-dimensional unitary group. These measures are unitary group analogs of the well-known Plancherel measures for symmetric groups. We show that any measure from our family defines a determinantal point process, and we prove that in appropriate scaling limits, such processes converge to two different extensions of the discrete sine process as well as to the extended Airy and Pearcey processes.