CENTRAL LIMIT THEOREM FOR ORTHOGONAL POLYNOMIAL ENSEMBLES AT MESOSCOPIC SCALES

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Let μ be a probability measure on the real line having all of the moments finite. The orthogonal polynomial ensemble of size $n \in \mathbb{N}$ is a measure on $\mathbb{R}^n$ proportional to

$$\prod_{1 \leq i < j \leq n} (x_i - x_j)^2 \mathrm{d}\mu(x_1) \ldots \mathrm{d}\mu(x_n).$$

The associated linear statistics are expressions of the form

$$X^{(n)}_{f,\alpha,x_0} = \sum_{j=1}^{n} f(n^\alpha (x_j - x_0)),$$

where $f : \mathbb{R} \to \mathbb{R}$ is a smooth function, x_0 is a real number and $\alpha \in (0, 1)$.

We are going to present CLT for linear statistics under conditions imposed on the three-term reccurrence relation satisfied by the orthogonal polynomials associated with the measure μ. Following recent work of Gaultier Lambert, the proof is reduced to the derivation of precise asymptotics of the orthogonal polynomials in question.

It is a joint work with Bartosz Trojan.