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Kooman's Theorem and Point Perturbation

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Abstract. This talk is about the class of probability measures $d\mu$ with asymptotically periodic Verblunsky coefficients of p -type bounded variation. The goal is to investigate the perturbation $\Delta_n(z)$ of the Verblunsky coefficients $\alpha_n(d\mu)$ when we add a pure point $z \in \partial\mathbb{D}$ to a gap.

In this talk, I will focus on the asymptotically constant case ($p = 1$). I am going to present the method I developed to obtain the asymptotic formulae for the orthonormal polynomials in the gap and prove that $\Delta_n(z)$ converges. Furthermore, I am going to show how one could compute the norm and the phase of the limit $\lim_{n \rightarrow \infty} \Delta_n(z)$.

Finally, I am going to consider the special case $\alpha_n = L + 1/c_n \in \mathbb{R}$ with $L < 0$, and prove that the rate of convergence of $\Delta_n(1)$ is in fact $O(1/c_n)$. In particular, the special case $c_n = n$ will serve as a counterexample to a misbelief that the convergence should be exponentially fast.