The Interlacing Log-concavity of the Boros-Moll Polynomials

William Y. C. Chen, Larry X. W. Wang and Ernest X. W. Xia

Abstract: We introduce the notion of interlacing log-concavity of a polynomial sequence $\{P_m(x)\}_{m \geq 0}$, where $P_m(x)$ is a polynomial of degree m with positive coefficients. This sequence is said to be interlacingly log-concave if the ratios of consecutive coefficients of $P_m(x)$ interlace the ratios of consecutive coefficients of $P_{m+1}(x)$ for any $m \geq 0$. The interlacing log-concavity of a sequence of polynomials is stronger than the log-concavity of the polynomials themselves. We show that the Boros-Moll polynomials are interlacingly log-concave. Furthermore, we give a sufficient condition for the interlacing log-concavity which implies that some classical combinatorial polynomials are interlacingly log-concave.

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