2-Log-concavity of the Boros-Moll Polynomials

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Abstract: The Boros-Moll polynomials $P_m(a)$ arise in the evaluation of a quartic integral. It has been conjectured by Boros and Moll that these polynomials are infinitely log-concave. In this paper, we show that $P_m(a)$ is 2-log-concave for any $m \geqslant 2$. Let $d_i(m)$ be the coefficient of a^i in $P_m(a)$. We also show that the sequence $\{i(i+1)(d^2_i(m) - d_{i-1}(m)d_{i+1}(m))\}_{1 \leqslant i \leqslant m}$ is log-concave.

AMS Classification: 05A10, 05A20; 33F10

Keywords: 2-log-concavity, Boros-Moll polynomial

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