Higher Order Log-Concavity in Euler's Difference Table

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Abstract: For $0 \leqslant k \leqslant n$, let e^k_n be the entries in Euler's difference table and let $d^k_n = e^k_n/k!$. Dumont and Randrianarivony showed e^k_n equals the number of permutations on $[n]$ whose fixed points are contained in $\{1, 2,..., k\}$. Rakotondrajao found a combinatorial interpretation of the number d^k_n in terms of k-fixed-points-permutations of $[n]$. We show that for any $n \geqslant 1$, the sequence $\{d^k_n\}_{0 \leqslant k \leqslant n}$ is both 2-log-concave and reverse ultra logconcave.

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Keywords: log-concavity, 2-log-concavity, reverse ultra log-concavity, Euler's difference table

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