The Ratio Monotonicity of the q-Derangement Numbers

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Abstract: We introduce the notion of ratio monotonicity for polynomials with nonnegative coefficients, and we show that for $n \geq 6$, the q-derangement numbers $D_n(q)$ are strictly ratio monotone, except for the last term when n is even. This property implies the spiral property and log-concavity.

AMS Classification: 05A30, 05A15.

Keywords: q-derangement number, spiral property, log-concavity, ratio monotone property.

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