Mathematics > Probability

A natural derivative on [0,n] and a binomial Poincaré inequality

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We consider probability measures supported on a finite discrete interval $[0,n]$. We introduce a new finitedifference operator ∇_n, defined as a linear combination of left and right finite differences. We show that this operator ∇_n plays a key role in a new Poincar\'e (spectral gap) inequality with respect to binomial weights, with the orthogonal Krawtchouk polynomials acting as eigenfunctions of the relevant operator. We briefly discuss the relationship of this operator to the problem of optimal transport of probability measures.

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