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On Krawtchouk Transforms

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Krawtchouk polynomials appear in a variety of contexts, most notably as orthogonal polynomials and in coding theory via the Krawtchouk transform. We present an operator calculus formulation of the Krawtchouk transform that is suitable for computer implementation. A positivity result for the Krawtchouk transform is shown. Then our approach is compared with the use of the Krawtchouk transform in coding theory where it appears in MacWilliams' and Delsarte's theorems on weight enumerators. We conclude with a construction of Krawtchouk polynomials in an arbitrary finite number of variables, orthogonal with respect to the multinomial distribution.

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