
A TECHNIQUE FOR DERIVING q –ANALOGUES OF CERTAIN SPECIAL MATRICES

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ABSTRACT

In matrix theory, there are numerous useful and special matrices. One of the most well-known and extensively studied matrices among them is undoubtedly the Pascal matrix. The algebraic approach based on Pascal matrices holds significant importance across various mathematical fields including algebraic geometry, optimization, matrix theory, and combinatorics. Several authors have extensively introduced and studied specific generalizations of Pascal matrices in detail. Matrix representations of sequences of various polynomials is also intriguing. We introduce a comprehensive approach for constructing q –analogues of some special matrices including Pascal matrix and matrices related with some polynomials. Using this method, we find explicit expressions for linear algebraic properties of matrices such as products, inverses, and powers, as well as specific factorization formulas.

Keywords Pascal matrix · Modified Hermite matrix · q -Integers · Matrix factorizations · Matrix inversion

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