



On The Analytical Properties of The Telephone Polynomials

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Abstract

In this study, several analytical properties of the telephone polynomials will be investigated. First, a Mehler-type formula that provides a new bilinear generating relation for this polynomial family and different types of generating function relations will be established to reveal the structural properties of the telephone polynomials. In addition, a mixed-type recurrence relation and a determinantal representation for the telephone polynomials will be derived, and their asymptotic behavior will be investigated. The obtained results are expected to contribute to the theory of special functions and orthogonal polynomials and to provide a basis for further studies in this area.

Keywords: Telephone polynomials, generating function, Mehler-type formula.

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