

# On the functions of several complex variables and the Homogeneous Hahn polynomials

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Using the theory of analytic functions of several complex variables, we prove that if an analytic function in several variables satisfies a system of  $q$ -partial differential equations, then, it can be expanded in terms of the product of the homogeneous Hahn polynomials. This expansion theorem provide a new insight into  $q$ -series. Some applications of this expansion theorem to  $q$ -series are discussed.