

# INVARIANT FACTOR OF MULTIVARIATE ORTHOGONAL POLYNOMIALS AND ITS APPLICATIONS

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## abstract

Stieltjes theorem reveals the relation between orthogonal polynomial and the continued fractions, that is, any orthogonal polynomial on a finite interval could be obtained from the continued fraction expansion of the function  $\int_a^b \frac{\rho(t)}{x-t} dt$ . And historically, the orthogonal polynomial originated in the theory of continued fractions. This relationship is of great importance and is one of the possible starting points of the treatment of orthogonal polynomials, but the view point of continued fraction is paid little attention to.

In our previous work, we introduce the definition of invariant factor to extend the Stieltjes theorem to multivariate cases. Invariant factor introduced by the speaker has some good properties and inherits most of properties of univariate orthogonal polynomials, which plays an important role in the research of common zero location of bivariate orthogonal polynomials. The aim of this talk is to introduce the conception of the invariant factor and its some properties, some results on multivariate orthogonal polynomials and their applications. The results include Stieltjes type theorem, the relation among invariant factor, multivariate orthogonal polynomials and Jacobi matrix, and common zeros location of multivariate orthogonal polynomials and so on. Some examples of multivariate are given in the end of the talk.

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