Bivariate Thiele-Like Rational Interpolation Continued Fractions with Parameters

Subjects: Algebra & Number Theory
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The interpolation of Thiele-type continued fractions is thought of as the traditional rational interpolation and plays a significant role in numerical analysis and image interpolation. Different to the classical method, a novel type of bivariate Thiele-like rational interpolation continued fractions with parameters is proposed to efficiently address the interpolation problem. Firstly, the multiplicity of the points is adjusted strategically. Secondly, bivariate Thiele-like rational interpolation continued fractions with parameters is developed. We also discuss the interpolant algorithm, theorem, and dual interpolation of the proposed interpolation method. Many interpolation functions can be gained through adjusting the parameter, which is flexible and convenient. We also demonstrate that the novel interpolation function can deal with the interpolation problems that inverse differences do not exist or that there are unattainable points appearing in classical Thiele-type continued fractions interpolation. Through the selection of proper parameters, the value of the interpolation function can be changed at any point in the interpolant region under unaltered interpolant data. Numerical examples are given to show that the developed methods achieve state-of-the-art performance.

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Keywords
Thiele-like rational interpolation continued fract; unattainable point; inverse difference; virtual point

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