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Aitken-Neville formulae for multivariate interpolation[†]

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Abstract

An extension of the Aitken-Neville interpolation formula to several variables was proposed by Gasca and Lebron in the 1980's, generalizing some previous papers by Thacher, Milne and Mühlbach. That paper is now revisited to show in detail the role of the different hypotheses and to include some other recent results on the subject within this approach.

Keywords: Aitken-Neville formula, generalized principal lattices, multivariate interpolation.

MSC: Primary 61A05; Secondary 41A05, 41A63.

§1. Introduction

The papers by Aitken [1] and Neville [14] on univariate interpolation were published in the 30's of the last century as an alternative to the Newton interpolation formula. The main idea of these papers was to avoid the explicit computation of the divided differences. The values of interpolating polynomials on smaller subsets are combined to provide the value of the interpolating polynomial on a bigger set using the idea of iterated linear interpolation. The algorithms by Aitken and Neville only differ in the strategy of choice of the subsets of nodes.

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