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Rational quasi-Hermite-Fejér-type interpolation and Lobatto-type quadrature formula with Chebyshev-Markov nodes

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Abstract

We present a quasi-Hermite-Fejér-type interpolation with nodes in the zeroes of Chebyshev–Markov sine fractions. The convergence of the considered interpolation process for any continuous function on $[-1, 1]$ is proved under the condition of the completeness of the corresponding system of rational functions. Next we construct Lobatto-type quadrature formula based on the quasi-Hermite-Fejér-type interpolation. We obtain coefficients of this quadrature in the explicit form. Also we derive convergence results for constructed quadrature formula.

Keywords: Quasi-Hermite-Fejér-type interpolation, Lobatto-type quadrature, rational space, prescribed poles, Chebyshev-Markov fractions.

MSC: Primary 41A20; Secondary 65D32.

§1. Introduction

The problems of quadrature formulas based on rational interpolation are considered in many works (cf. [3]). The main idea of the present paper is to construct a rational interpolation process and the corresponding quadrature formula with prescribed nodes based on the Chebyshev–Markov fractions.

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