

On some weighted quadrature rules on equispaced nodes through constrained mock-Chebyshev interpolation

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Abstract

We get accurate quadrature formulas from equispaced nodes with high degree of exactness, by using Gaussian-Christoffel formulas and a mixed interpolation-regression process, in combination. More in detail, we substitute the exact values $f(\xi_k)$ with the values at Christoffel abscissas ξ_k of the constrained mock-Chebyshev least-squares interpolant $\hat{P}_{r,n}[f]$ of a suitable degree r [1, 2]. We develop an adaptive algorithm for determining the optimal degree r of the constrained mock-Chebyshev least-squares interpolation to get quadrature formulas as much accurate as possible. The algorithm generalizes to the bivariate case by means of the constrained mock-Chebyshev least-squares tensor product interpolation [2].

Keywords: Quadrature formulas, degree of exactness, equispaced points.

References

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