

A new approach for constructing mock-Chebyshev grids

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Abstract

Polynomial interpolation with equidistant nodes is notoriously unreliable due to the Runge phenomenon, and is also numerically ill-conditioned. By taking advantage of the optimality of the interpolation processes on Chebyshev nodes, one of the best strategies to defeat the Runge phenomenon is to use the mock-Chebyshev points, which are selected from a satisfactory uniform grid, for polynomial interpolation. Yet, little literature exists on the computation of these points. In this study, we investigate the properties of the mock-Chebyshev nodes and propose a subsetting method for constructing mock-Chebyshev grids. Moreover, we provide a precise formula for the cardinality of a satisfactory uniform grid. Some numerical experiments using the points obtained by the method are given to show the effectiveness of the proposed method and numerical results are also provided.

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