Constrained mock-Chebyshev least squares operator and its applications

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Abstract
The constrained mock-Chebyshev least squares operator is a linear approximation operator based on an equispaced grid of points. Similar to other polynomial or rational approximation methods, it was recently developed to defeat the Runge phenomenon that arises when employing polynomial interpolation on large sets of equally spaced points. The key concept is to improve the mock-Chebyshev subset interpolation, where the function f is interpolated only on a specific subset of the uniform grid. This subset is formed by nodes that emulate the behavior of Chebyshev–Lobatto nodes. In the mock-Chebyshev subset interpolation, all remaining nodes are discarded. However, in the constrained mock-Chebyshev least squares interpolation, these discarded nodes are used in a simultaneous regression to further enhance the accuracy of the approximation provided by the mock-Chebyshev subset interpolation.

In this study, we delve into the theoretical basis of the constrained mock-Chebyshev least squares operator and use it in a range of applications.

References

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