

Second order BDF method for FODE and FKS equations

The Authors

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Review of the first order scheme

The second order scheme

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stability and accuracy results of the BDF method for $D_c^\gamma u = \lambda u$.

stability results on variant BDF method.

2.3 Main results on the first/second order method for FKS

stability.

small data condition?

3 Construction of the numerical approximation of the Caputo derivative

derivation.

estimates on the coefficients.

4 Stability and convergence analysis

5 Numerical results

5.1 FODE

stability region plot with variant n .

convergence order test for $D_c^\gamma u = \lambda u$ with BDF and variant BDF methods, where exact solution is available.

convergence order test for $D_c^\gamma u = f(u)$, where reference solution is computed with fine mesh.

5.2 FKS