

Dispersion Relation Preserving Optimization for High Wavenumber Midpoint Interpolation

Braulio Gutierrez Pimenta (braulio@unb.br)

André Von Borries Lopes (andre.lopes@unb.br)

Mechanical Engineering Department, University of Brasília

Abstract. Optimization in the wavelength space is proposed to interpolations with central numeric stencils. Applications include primarily the area of Computational Fluid Mechanics (CFD) and other numerical methods based on spatial discretization. Maximum precision is ensured by Taylor series expansion where one of the degrees of freedom is then used to minimize error in the spectral space. Explicit and implicit forms are proposed for various orders of precision from the stencil numeric variation. Results show optimal gain in numerical error for high wave numbers by modifying the coefficients of the interpolation schemes, maintaining the numerically defined precision.

References

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