The Hong Kong University of Science and Technology

Department of Mathematics

MPhil THESIS EXAMINATION

Spherical Essentially Non-Oscillatory Interpolation

By

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ABSTRACT

We proposed a recursive interpolation scheme that gives high order interpolants called Spherical Interpolation of DEgRee (SIDER in short) on the unit sphere $\mathbf{S}^2$. The idea generalizes the construction of the Bézier curves in $\mathbf{R}$. We also adopt the philosophy of Essentially Non-Oscillatory (ENO) schemes from $\mathbf{R}$ to $\mathbf{S}^2$ to develop Spherical Essentially Non-Oscillatory (SENO in short) schemes using SIDER as the building pieces. Given $n + 1$ data points that satisfy certain constraints, there must be one SIDERn that passes through all the data points with C^n continuity (if $n = 2$ or 3). When the underlying curve on $\mathbf{S}^2$ has kinks or sharp discontinuity in the higher derivatives, SENO can reduce spurious oscillations in high order reconstructions.

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(Open to all faculty and students)

The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).