

Group Meeting

Week 15, Spring 2019

Brandon Gusto

Dept. of Scientific Computing
Florida State University

April 15, 2019

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

- ▶ compute forward transform of cell-averaged data

$$\{u_i^0\}_{i=1}^{N^0} = \mathbf{u}^0$$

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

- ▶ compute forward transform of cell-averaged data

$$\{u_i^0\}_{i=1}^{N^0} = \mathbf{u}^0$$

- ▶ obtain detail coefficients $\{\mathbf{d}\}_{l=L}^1$

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

- ▶ compute forward transform of cell-averaged data
$$\{u_i^0\}_{i=1}^{N^0} = \mathbf{u}^0$$
- ▶ obtain detail coefficients $\{\mathbf{d}\}_{l=L}^1$
- ▶ truncate coefficients as $d_i^l \leftarrow 0, |d_i^l| \leq \epsilon$

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

- ▶ compute forward transform of cell-averaged data
$$\{u_i^0\}_{i=1}^{N^0} = \mathbf{u}^0$$
- ▶ obtain detail coefficients $\{\mathbf{d}\}_{l=L}^1$
- ▶ truncate coefficients as $d_i^l \leftarrow 0, |d_i^l| \leq \epsilon$
- ▶ inverse transform gives us approximation $\tilde{\mathbf{u}}^0$

Recent Progress with Multiresolution Scheme

Recap of multiresolution ideas:

- ▶ compute forward transform of cell-averaged data

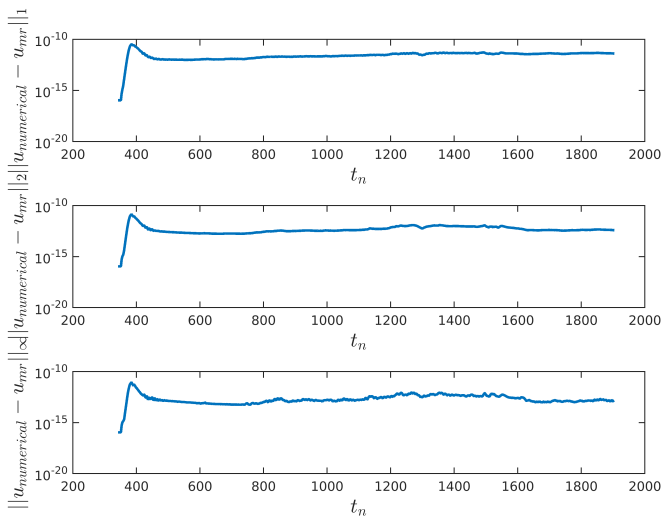
$$\{u_i^0\}_{i=1}^{N^0} = \mathbf{u}^0$$

- ▶ obtain detail coefficients $\{\mathbf{d}\}_{l=L}^1$
- ▶ truncate coefficients as $d_i^l \leftarrow 0, |d_i^l| \leq \epsilon$
- ▶ inverse transform gives us approximation $\tilde{\mathbf{u}}^0$
- ▶ guaranteed that $\|\mathbf{u}^0 - \tilde{\mathbf{u}}^0\| \leq C_u \epsilon$

Error

When doing the inverse transform on the flux function instead, we get $\|\mathbf{f}^0 - \tilde{\mathbf{f}}^0\| \leq C_f \epsilon$, but what is C_f ? Intuitively, $C_f \geq C_u$.

Solution Comparison



Solution Comparison

Ratio of fluxes interpolated to total fluxes...

