

Group Meeting Week 6, Spring 2019

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Multiresolution Flux Scheme

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Multiresolution Flux Scheme

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1. forward wavelet transform on density data
2. construction of a mask
3. conversion of density flux to a cell-average interpretation

$$R_i^L = F_{i+1/2}^L - F_{i-1/2}^L$$

4. replacing certain cells with interpolation, based on mask information

$$R_{2i+1}^{l+1} = \sum_l \gamma_l R_i^l$$

$$R_{2i}^{l+1} = 2R_i^l - R_{2i+1}^l$$

Preliminary Results

The following movies show active cells in the hierarchy (top) and detail coefficients of the density transform (black) and density flux transform (red) (bottom). This is Two Blast Waves problem.

Preliminary Results

Same data here but with a smaller tolerance.

Preliminary Results

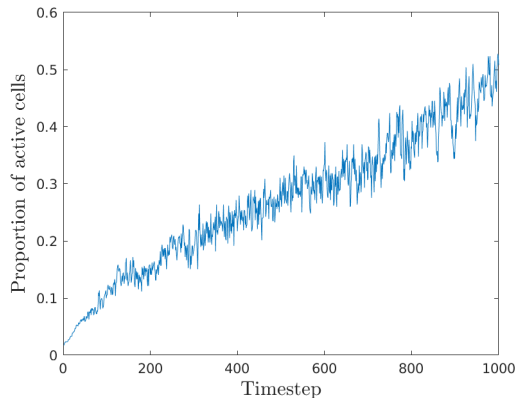
Here is a plot of the density over time for the same problem (low resolution).

Preliminary Results

Density over time for higher resolution.

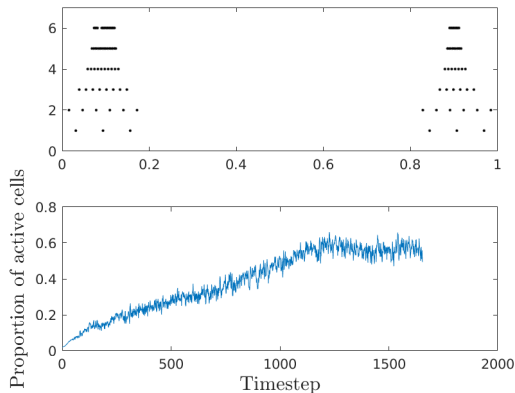
Preliminary Results

Proportion of active cells at the finest level during the simulation.



Preliminary Results

Proportion of active cells at the finest level during the simulation (higher tolerance).



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- ▶ test a suite of problems
- ▶ run on parallel blocks
- ▶ compare solutions obtained via MR with non-MR
- ▶ pass a non-uniform array to `hydro_1d.F90`, test efficiency