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P-09. Joakim Refslund Nielsen: Combining a spatial filter with a new locally mass conserving transport scheme

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An efficient locally mass conserving spatial filter is implemented into a new locally mass conserving semi-Lagrangian transport scheme developed by Kaas (2008). The new scheme uses modified interpolation weights at the upstream departure points to ensure local mass conservation. The new filter efficiently ensures monotonicity and positive definiteness and surprisingly it enhances accuracy especially near sharp gradients and discontinuities. Through detection of regions with non-monotonic behavior, target values are setup and the mass is then redistributed under the strong constraint of local total mass conservation. The properties of the filter are tested in a one dimensional model and presented.

References:

Kaas, E., 2008. An accurate and efficient transport scheme. part i: A new locally mass-conserving semi-Lagrangian solution to the continuity equation.