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Professor Morel
Editor,
Journal of Computational Physics

Dear Professor Morel,

Please find attached a copy of our manuscript titled "Flux-Corrected Transport Techniques Applied to the Radiation Transport Equation Discretized with Continuous Finite Elements" for submission to the *Journal of Computational Physics*.

Flux-Corrected Techniques (FCT) find their origins within the fluid dynamics community where they have been devised to combat the formation of spurious oscillations in finite-difference solution techniques. Over the last decade or so, these FCT techniques have been extended to continuous finite element discretizations (e.g., the extensive archival work of D. Kuzmin on FEM-FCT). However, these techniques have not yet been employed in the radiation transport community and this manuscript aims at bridging this gap. Our present work combines

1. solving the first-order radiation transport equation with CFEM;
2. defining low-order and high-order CFEM discretizations for the first-order radiation transport, as required in the FCT method;
3. devising FCT bounds definitions that satisfy a discrete-maximum principle for radiation transport;
4. analyzing time-dependent (explicit and implicit) and steady-state FCT algorithms with the proposed method.

Rather than employing a pure Galerkin discretization as the high-order scheme, we employ an entropy-viscosity (EV) based scheme as our high-order discretization and compare both approaches, Galerkin and EV, in the manuscript.

Numerous publications pertaining to FCT techniques have appeared in JCP and we feel this is the proper venue for this manuscript.

This work follows prior works by Kuzmin (e.g., "Explicit and implicit FEM-FCT algorithms with flux linearization", Journal of Computational Physics, Volume 228, 2009); Guermond & Popov (e.g., "Entropy viscosity method for nonlinear conservation laws", Journal of Computational Physics, Volume 230, 2011).

Thank you for considering this manuscript for publication in the *Journal of Computational Physics*.

Best regards,

Joshua Hansel & Jean Ragusa