Some influences on accuracy of numerical solutions of PDEs given by adaptive methods based on equidistribution.

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Numerical experiments are described that illustrate some important features concerning the performance of moving mesh methods for solving PDEs, with illustrations focused on one-dimensional problems. The particular method considered here is an adaptive finite difference method based on the equidistribution of a monitor function, and it is one of the moving mesh methods proposed by Huang, Ren and Russell [SIAM J. Numer. Anal. **31** (1994) 709-730]. We show how the accuracy of the computations is strongly dependent on the choice of monitor function, and we present a monitor function that yields an optimal rate of convergence. We demonstrate a robust and efficient algorithm in which the mesh equations are uncoupled from the physical PDE. The accuracy and efficiency of the various formulations of the algorithm are considered and a novel automatic time-step control mechanism is integrated into the scheme.

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