

SCALAR CONSERVATION LAWS ON MOVING HYPERSURFACES

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ABSTRACT. We consider conservation laws on moving hypersurfaces. In this work the velocity of the surface is prescribed. But one may think of the velocity to be given by PDEs in the bulk phase. We prove existence and uniqueness for a scalar conservation law on the moving surface. This is done via a parabolic regularization of the hyperbolic PDE. We then prove suitable estimates for the solution of the regularized PDE, that are independent of the regularization parameter. We introduce the concept of an entropy solution for a scalar conservation law on a moving hypersurface. We also present some numerical experiments. As in the Euclidean case we expect discontinuous solutions, in particular shocks. It turns out that in addition to the "Euclidean shocks" geometrically induced shocks may appear.

This is a joint work together with G. Dziuk and T. Mueller.

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