Fractional regularity for scalar conservation laws with discontinuous flux

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Abstract

In this talk, we discuss the regularity aspects of the entropy solutions for scalar conservation laws with discontinuous flux. From the work [Adimurthi et al., Comm. Pure Appl. Math. 2011], it is well-known that there exists initial data in BV such that the corresponding entropy solution does not belong to BV space. Consequently, we investigate the necessity of fractional BV^s spaces, which is a bigger space than BV, with $0 < s \leq 1$. We prove the optimal regularizing effect for the discontinuous flux with L^∞ initial data. The optimal regularizing effect in BV^s is proven in an important case using control theory, and the fractional exponent s is at most $1/2$, even when the fluxes are uniformly convex.

Keywords: scalar conservation laws, discontinuous flux, fractional BV functions.