

Fractional regularity for conservation laws with discontinuous flux

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This article deals with the regularity of the entropy solution of scalar conservation laws with a discontinuous flux. It is well-known [Adimurthi et al., *Comm. Pure Appl. Math.* 2011] that the entropy solution for such equation does not admit in general BV regularity even when the initial data belongs to the BV space of functions of bounded variations. Due to this phenomenon spaces wider than BV are required. The fractional BV spaces, BV^s are used where the exponent $0 < s \leq 1$ corresponds to the fractional Sobolev regularity and $BV = BV^1$. Here we establish the optimal regularizing effect for the discontinuous flux with initial data in L^∞ . We prove, under non-degeneracy conditions on the flux, that the solution belongs to a fractional BV space. The optimal regularizing effect in BV^s is shown with a sharp counter-example. The fractional exponent s is at most $1/2$. ([1, 2, 3])

References

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