Conservation laws and fractional BV spaces

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Abstract.
The self contained lectures present the basic theory on conservation laws in the new BV^s framework. The fractional BV spaces BV^s (with $0 < s < 1$) share many properties with $\mathrm{BV} = \mathrm{BV}^1$ but with less regularity.

First, the one dimensional scalar case is presented with the crucial role of the BV space (space of functions of bounded variations which is a space very famous in Italy thanks to the major results due to the Mathematical Italian School on BV and more recently on SBV).

Second, simple examples show that "BV is not enough" for conservation laws. New sharp results are proven in the BV^s framework. For entropy solutions of conservation laws, fractional BV spaces appear more informative than fractional Sobolev spaces.

Third, BV^s are used for some hyperbolic systems and some open problems are reformulated in BV^s.