RELATIVE ENTROPY METHOD
FOR MEASURE-VALUED SOLUTIONS
IN NATURAL SCIENCES

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Abstract. We describe the applications of the relative entropy framework introduced in [10]. In particular the uniqueness of an entropy solution is proven for a scalar conservation law, using the notion of measure-valued entropy solutions. Further we survey recent results concerning measure-valued-strong uniqueness for a number of physical systems — incompressible and compressible Euler equations, compressible Navier–Stokes, poly-convex elastodynamics and general hyperbolic conservation laws, as well as long-time asymptotics of the McKendrick–Von Foerster equation.

1. Introduction

The origins of the relative entropy method can be traced back to physics. The underlying principle behind it is the simple idea to measure in a certain way how much two evolutions of a given physical system, whose initial states