Measure-valued solutions in fluid dynamics

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As more and more ill-posedness results have been shown for fluid PDEs (not only by convex integration!), the idea to solve the Cauchy problem by some unique weak or entropy solution has become questionable. Instead, non-deterministic solution concepts such as measure-valued or statistical have sparked much recent research interest. They also seem to be more in line with well-known theories of turbulence, which are typically statistical. I will give an overview of measure-valued solution concepts, including their weak-strong stability, their relation to more conventional solutions, and questions of existence. Links to other notions of "very weak" solution (dissipative, subsolutions, energy-variational) will briefly be discussed.