

On ill- and well-posedness of dissipative martingale solutions to stochastic 3D Euler equations

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Abstract: We are concerned with the question of well-posedness of stochastic three dimensional incompressible Euler equations. In particular, we introduce a novel class of dissipative solutions and show that (i) existence; (ii) weak-strong uniqueness; (iii) non-uniqueness in law; (iv) existence of a strong Markov solution; (v) non-uniqueness of strong Markov solutions; all hold true within this class. Moreover, as a byproduct of (iii) we obtain existence and non-uniqueness of probabilistically strong and analytically weak solutions defined up to a stopping time and satisfying an energy inequality.