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Existence of a martingale solution of the stochastic Navier-Stokes equations in unbounded 2D and 3D domains. (English) [Zbl 1259.35230](#)

J. Differ. Equations 254, No. 4, 1627-1685 (2013).

Summary: Stochastic Navier-Stokes equations in 2D and 3D possibly unbounded domains driven by a multiplicative Gaussian noise are considered. The noise term depends on the unknown velocity and its spatial derivatives. The existence of a martingale solution is proved. The construction of the solution is based on the classical Faedo-Galerkin approximation, the compactness method and the Jakubowski version of the Skorokhod Theorem for nonmetric spaces. Moreover, some compactness and tightness criteria in nonmetric spaces are proved. Compactness results are based on a certain generalization of the classical Dubinsky Theorem.

MSC:

- [35R60](#) PDEs with randomness, stochastic partial differential equations
- [35Q30](#) Navier-Stokes equations
- [60H15](#) Stochastic partial differential equations (aspects of stochastic analysis)
- [76M35](#) Stochastic analysis applied to problems in fluid mechanics

Cited in **40** Documents

Keywords:

stochastic Navier-Stokes equations; martingale solution; compactness method

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