

On Serrin-Type Spatially-Periodic Solutions for Evolution Anisotropic Navier-Stokes Equations

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Abstract

We consider evolution (non-stationary) space-periodic solutions to the n -dimensional non-linear Navier-Stokes equations of anisotropic fluids with the viscosity coefficient tensor variable in space and time and satisfying the relaxed ellipticity condition. Employing the Galerkin algorithm, we prove the existence of Serrin-type solutions, that is, the weak solutions with the velocity in the periodic space $L_2(0, T; \dot{\mathbf{H}}_{\#\sigma}^{n/2})$, $n \geq 2$. The solution uniqueness and regularity results are also discussed. The talk is based on the following papers.

1. S.E. Mikhailov, Spatially-Periodic Solutions for Evolution Anisotropic Variable-Coefficient Navier-Stokes Equations: I. Weak Solution Existence. *Mathematics*, **12**(12), 1817 (2024), 1–27, <https://doi.org/10.3390/math12121817>.
2. S.E. Mikhailov, Spatially-Periodic Solutions for Evolution Anisotropic Variable-Coefficient Navier-Stokes Equations: II. Serrin-Type Solutions. *arXiv2407.05488*, 2024, 44p.