
Existence and uniqueness for heat equations with hysteresis coupled with Navier-Stokes equations in 2D and 3D domains

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Abstract

There was no result on existence and uniqueness for a system of heat equations with hysteresis and Navier-Stokes equations, which describes phenomenon by thermostat devices with incompressible fluid. Recently, an existence result for the problem in a 2D domain was obtained in [1], provided that the Navier-Stokes equation was dealt with in a weak sense. However this result does not assert uniqueness for the problem nor the 3D case. In this talk, by turning our eyes to a new inequality, we establish not only existence but also uniqueness for the problem in both the 2D and 3D cases. Here we deal with the Navier-Stokes equation in a stronger sense by introducing the fractional power of the Stokes operator A^α . In particular, we give a sufficient condition for α to solve the problem.

References

- [1] Y. Tsuzuki, *Existence of solutions to heat equations with hysteresis coupled with Navier-Stokes equations in 2D domains*, J. Math. Anal. Appl., **423** (2015), 877–897.

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