PARAMETER DEPENDENT NOVIER-STOKES LIKE PROBLEMS

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Abstract

In this talk, the following nonstationary Novier-Stokes like equation with variable coefficients

$$\frac{\partial u}{\partial t} - A_{\varepsilon}(x)\, u + (u.\nabla)\, u + \nabla \varphi = f(x,t), \ \operatorname{div} u = 0, \ x \in G, \ t \in (0,T),$$

$$L_{1\varepsilon} u = \sum_{i=0}^{\nu} \varepsilon^{\sigma_i} \alpha_i \frac{\partial^i u}{\partial x_n^i} \left(x^{'}, 0, t\right) = 0, \ \nu \in \{0,1\},$$

$$u(x,0) = a(x), \ x \in R_+^n, \ t \in (0,T),$$

is considered, where

$$R_+^n = \left\{ x \in R^n, \ x_n > 0, \ x = \left(x^{'}, x_n\right), \ x^{'} = (x_1, x_2, ..., x_{n-1}) \right\},$$

$$A_{\varepsilon}(x)\, u = \varepsilon \sum_{k=1}^{n} a_k(x) \frac{\partial^2 u}{\partial x_k^2}, \ \sigma_i = \frac{1}{2}\left(i + \frac{1}{q}\right), \ q \in (1, \infty),$$

ε is a small positive parameter, α_i are complex numbers, a_k are continious functions on R_n^n,

$$u = u_{\varepsilon}(x) = (u_{1\varepsilon}(x,t), u_{2\varepsilon}(x,t), ..., u_{n\varepsilon}(x,t))$$

are represent the unknown velocity, $f = (f_1(x,t), f_2(x,t), ..., f_n(x,t))$ represents a given external force and a denotes the initial velocity.

The existence, uniqueness and L^p estimates of solution the above problem is derived.