

Stokes resolvent problem with Neumann type boundary condition

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I will consider the Stokes resolvent problem with Neumann or traction conditions on the boundary. This problem was already treated by Solonnikov and Grubb with some series of papers by a systematic use of the theory of pseudo-differential operators. My proof is essentially different from theirs. One of the characteristics of the Stokes problem is to handle the divergence free condition. When we localize the problem near the boundary, we have to treat non-zero divergence condition. In order to do that, we use a solution to Laplace equation with Dirichlet zero condition. Namely, we can reduce the problem to the model problem in the half space with divergence free condition after subtracting the solution to Laplace equation with Dirichlet zero condition. My idea follows the paper due to Farwig and Sohr concerning the Stokes resolvent problem with Dirichlet zero condition. In their case, instead of Dirichlet zero condition, they use a solution to the Laplace equation with Neumann zero condition. If possible, I would like to talk about some simple applications to the Navier-Stokes equation.