Partial Fourier Transform Method for Solution Formula of Stokes Equation with Robin Boundary Condition in Half-space

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Abstract	The area of applied science known as fluid dynamics studied how gases and liquids moved. The motion of the fluid in the liquid and vapour phases is described by a special system of partial differential equations. The research purpose of this article investigated the solution formula of incompressible Stokes equation with the Robin boundary condition in half-space case. The solution formula for Stokes equation was calculated using the partial Fourier transform. This calculation was carried out over the Weis' multipliers theorem. Our calculation showed that the solution formula of Stokes equation with Robin boundary condition in half-space for velocity and pressure were contained multipliers as due to work Shibata & Shimada. Due to our consideration of the half-space situation, the partial Fourier transform approach is the most appropriate one to use to get the velocity and pressure for the Stokes equation with Robin boundary condition. Furthermore, research methods in this article, in the first stage, we use the resolvent problem of the model. Secondly, we apply the partial Fourier transform to the model problem and finally, we use inverse partial Fourier transform to get the solution formula of the incompressible type of Stokes equation for velocity and pressure. This result indicates that Weis' multiplier theorem also allows us to find the local well-posedness of the model problem in addition to the maximal Lp-Lq regularity class (Gerard-Varet et al., 2020).
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