

Non-stationary Navier-Stokes equations in $2D$ power cusp domain

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Abstract

The initial boundary value problem for the non-stationary Navier-Stokes equations is studied in $2D$ bounded domain with a power cusp singular point O on the boundary. We consider the case where the boundary value has a nonzero flux over the boundary. In this case there is a source/sink in O and the solution necessary has infinite energy integral. The asymptotic decomposition of the solution near the singular point is constructed and justified, i.e., existence of the solution which is represented as the sum of the constructed asymptotic expansion and a term with finite energy norm is proved. Moreover, it is proved that the solution represented in this form is unique.

Keywords: Non-stationary Navier-Stokes problem, power cusp domain, singular solutions, asymptotic expansion.

References

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