

Viscosity Splitting scheme to solve Navier-Stokes equations with dissipative boundary conditions: Application to the respiratory tract

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In the world of medical imaging, we cannot visualize the entire lung. We are therefore working on numerical modelling of air flow in the respiratory tract. This leads us to an incompressible Navier-Stokes problem with artificial boundary conditions in domains with a tree structure, see for instance [1]. Compared with the various existing methods, the methodology will consist in using the Viscosity Splitting method with the backward differentiation formula 1 (BDF1) for the time discretization to gain in accuracy and computing time, see for example [2, 3]. The numerical simulation is done with FreeFEM++ [4]. We are also interested in the effect of temperature on respiration by incorporating into the studied model a diffusion-convection equation. The objective is to find a method that best simulates airflow in the lungs, minimizing computing time, including special cases, by obtaining 2D results

References

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