

An adaptive method to verify the lack of collision between solid bodies in a 2D incompressible viscous flow

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Abstract: Our goal is to check numerically a Theorem of Hillairet [1] which says that a solid body falling in a constant-density incompressible viscous fluid cannot reach the bottom of the cavity in finite time. A penalty method is used to formulate the fluid flow problem in the whole cavity, thus avoiding the solid-liquid interface to be tracked. However, an adaptive method in space and time is advocated, the error indicators in space and time being derived on simplified problems. Numerical experiments indeed show that the solid body does not reach the bottom of the cavity in finite time.

References

- [1] M. Hillairet. *Lack of collision between solid bodies in a 2D incompressible viscous flow*, Communications in Partial Differential Equations, **32**(9), 2007.