ASYMPTOTICS OF GREEN'S FUNCTION AND ITS APPLICATION TO AN APPROXIMATE SOLUTION TO THE HELE-SHAW PROBLEM

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It is proposed the method of an approximate solution to several variants of the problems describing 2D flow of the viscous incompressible fluid (see, e.g. [1]). The method is developed on the base of the asymptotic results for Green's function of mixed boundary value problems to the Laplace equations established recently by V. Maz'ya and A. Movchan [2].

The following scenario are considered:

1) small fixed obstacle in the Hele-Shaw flow (see [3]);

2) moving stone in the Hele-Shaw (see [4]);

3) several fixed and moving stones/obstacles (moving clouds)in the Hele-Shaw flow (see [5]).

Refrences

1. *Gustafsson B., Vasil'ev A. Conformal and Potential Analysis in Hele-Shaw cells*, Basel-Boston-Berlin: Birkhäuser Verlag (2006).

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3. *Mishuris G., Rogosin S., Wrobel M.* Hele-Shaw flow with a small obstacle. *Meccanica* **49** (2014), 2037-2047.

4. *Mishuris G., Rogosin S., Wrobel M.* Moving stone in the Hele-Shaw flow. *Mathematika* **61** (2) (2015), 457-474.

5. *Mishuris G., Peck D., Rogosin S., Wrobel M.* Simulating the Hele-Shaw flow in the presence of various obstacles and moving particles (submitted).