Section 09: Partial Differential Equations | Poster number 433

Homogenization theorem for boundary–value problems in perforated domain with oscillating boundary

Gregory A. Chechkin, Department of Differential equations, Faculty of Mechanics and Mathematics, Moscow State University, Moscow 119899, Russia.

ABSTRACT

We consider a perforated body with internal perforation, i.e. the intersection of the perforation and the external boundary of the body is empty, with rough surface. One special case, when the structures of the perforation and the boundary oscillation are consistent, see in [1]. In this work we study the effective behavior of such a body. Both the perforation and the profile of the oscillating external boundary are locally periodic. Assuming no accordance between the internal and the boundary microstructures, we derive the homogenized model and prove the convergence result.

Here we use the compensated compactness method (see [2]) and the theorem of convergence of arbitrary solutions.

Acknowledgments. The work was supported in part by RFBR grant No. 99-01-00056

References

[1] Belyaev, A.G., and Piatnitski, A.L., and Chechkin, G.A. Asymptotic Behavior of Solution for Boundary–Value Problem in a Perforated Domain with Oscillating Boundary. *Siberian Mathematical Journal* **39** (4, 1998) 621–644.

[2] Murat, F., and Tartar, L. *Calcul des variations et homogénéisation.* R 84012. Paris. Universite Pierre et Marie Curie, Centre National de la Recherche Scientifique, Laboratoire d'analyse numérique (1984).

Keywords: *Homogenization, locally periodic perforation, oscillating boundary*

Mathematics Subject Classification: *35B27, 35B40*

Contact Address: chechkin@sci.lebedev.ru