On the Forchheimer extended Darcy–Brinkman flow through a thin channel

Marko Radulović

Croatia, University of Zagreb, Faculty of Science, Deparment of Mathematics

This is a joint work with Professor Igor Pažanin (University of Zagreb, Croatia).

In this talk, we will consider the flow through a thin fracture filled with fluid-saturated sparsely packed porous medium. The problem is described by the Forchheimer extended Darcy-Brinkman model incorporating the quadratic drag term as a result of the inertial effects.

Employing asymptotic analysis with respect to the fracture's thickness, we will derive the higher-order approximation for the velocity and pressure distribution explicitly acknowledging the Forchheimer (inertial) term and provide numerical examples as well. We will perform a rigorous error analysis to indicate the order of accuracy of the proposed approximate solution.

These results were published in [1].

[1] I. Pažanin, M. Radulović, On the Forchheimer-extended Darcy-Brinkman flow through a thin fracture, Zeitschrift fur Angewandte Mathematik und Mechanik (2024), pp. 1-16.