Anja Vrbaski* (anja.vrbaski@rgn.hr), Faculty of Mining, Geology and Petroleum Eng., Pierottijeva 6, 10000 Zagreb, Croatia. Homogenized model of immiscible incompressible two-phase flow in double porosity media.

We present a new proof of the homogenization result for immiscible incompressible two-phase flow in double porosity media. The fractured medium is composed of periodically repeating homogeneous matrix blocks and fractures, where the absolute permeability is discontinuous at the boundary between the two media. We start from the microscopic model, which consists of the mass conservation laws of both fluids along with the standard Darcy-Muskat law. The problem is written in terms of the phase formulation, i.e. where the phase pressures and the phase saturations are primary unknowns. We consider a domain made up of several zones with different characteristics: porosity, absolute permeability, relative permeabilities and capillary pressure curves. Under some realistic assumptions on the data, we prove the convergence of the solutions and derive the macroscopic models corresponding to various range of contrast, using the two-scale convergence method combined with the dilatation technique. Our results improve upon previously derived effective models [Bourgeat, Luckhaus, Mikelić(1996); Yeh (2006)] to highly heterogeneous porous media with discontinuous capillary pressures. This is a joint work with B. Amaziane, M. Jurak and L. Pankratov. (Received January 29, 2019)