Two phase flow in porous media with dynamic effects in the capillary pressure: finite volume analysis

X. Cao[1], **S.F. Nemadjieu**[1], **I.S. Pop**[1,2]

[1] Department of Mathematics and Computer Science, Eindhoven University of Technology, 5600 MB, Eindhoven, The Netherlands

[2] Department of Mathematics, Faculty of Mathematics and Natural Sciences, University of Bergen, Norway

Abstract. In this presentation, we study a two phase flow problem in porous media where the dynamic effect is included in the capillary pressure of the model problem. We first give the existence and uniqueness of the weak solution. Next, we present a finite volume method for the simulation of the solution. The method is based on a multi-points flux approximation of the type O-method. An energy estimate is derived for the numerical solution, and the use of the compactness argument helps to prove the convergence to the weak solution as the mesh size tends to zero. Finally we present some numerical results to confirm the theory.