Modeling and Numerical Simulation of the Migration of Gas in the System of a Storage of Radioactive Waste

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PLAN

- Research activities, team of Lyon: Talk of F. Smaï.
- Research activities, team of Nancy: Talk of M. Panfilov.
- Research activities, team of Pau: Talk of B. Amaziane.

Research activities, team of Pau

Mathematical and Numerical Modeling of Compressible Immiscible Two-Phase Flow in Heterogeneous Porous Media: Application to Gas Migration in a Nuclear Waste Repository

- **B. Amaziane, M. Jurak** A new formulation of immiscible compressible two-phase flow in porous media, **CRAS Mécanique, 336, 600–605, 2008.**
- **B. Amaziane, M. Jurak, A. Žgaljić Keko** Modeling and Numerical Simulations of Immiscible Compressible Two-Phase Flow in Porous Media by the Concept of Global Pressure, **Transport in Porous Media, DOI 10.1007/s11242-009-9489-8, 2009.**
- **M. Afif, B. Amaziane** Convergence of a Finite Volume Scheme and Numerical Simulations for 1D Water-Gas Flow in Heterogeneous Porous Media, 2009.

Research activities, team of Pau

- **Benchmark:** Test case BO-BGI proposed by C. Chavant.
- Gas Migration through Engineered and Geological Barriers for a Deep Repository for Radioactive Waste: Modeling & Numerical Simulations, MiniSymposium organized by MoMaS at MAMERN 2009: 3rd International Conference on Approximation Methods and Numerical Modeling in Environment and Natural Resources, June 8–11, 2009 Pau, France. http://lma.univ-pau.fr/meet/mamern09/en/programme_scientifique.php

- **B. Amaziane, S. Antontsev, L. Pankratov, A. Piatnitski Homogenization of immiscible compressible two-phase flow in porous media, 2009.**

$$\begin{cases} 0 \le S^\varepsilon(x,t) \le 1 \quad \text{in } \Omega_T, \\ \Phi^\varepsilon(x)\dfrac{\partial S^\varepsilon}{\partial t} - \operatorname{div}\left(K^\varepsilon(x)\lambda_w(S^\varepsilon)\left(\nabla p_w^\varepsilon - \vec{g}\right)\right) = 0 \quad \text{in } \Omega_T; \\ \Phi^\varepsilon(x)\dfrac{\partial(\rho_g^\varepsilon(1-S^\varepsilon))}{\partial t} - \operatorname{div}\left(K^\varepsilon(x)\lambda_g(S^\varepsilon)\rho_g^\varepsilon\left(\nabla p_g^\varepsilon - \rho_g^\varepsilon\vec{g}\right)\right) = 0 \quad \text{in } \Omega \\ P_c\left(S^\varepsilon\right) = p_g^\varepsilon - p_w^\varepsilon \quad \text{in } \Omega_T, \end{cases} \tag{1}$$

Idea of the proof: A priori estimates (cf. Galusinski & Saad), A compactness result and Two-Scale Convergence.

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