A new computational technique for modeling underground reservoirs AMIR ARYA, Politecnico Di Torino — The water-oil micro-emulsion in underground reservoirs is considered as one of the most important processes in enhanced oil recovery. The water flow in many natural reservoirs is characterized by density gradients due to the variation of temperature or salinity. Despite this, the effect of stratification on the oil recovery is yet to be explored. Here, we demonstrate the importance of the density stratification on the water-oil interaction in underground reservoirs. We use a system of a drop in a cavity as an idealized model simulating the oil droplets in the rock of the oil. We perform a comprehensive parametric study in order to characterize combined effects of buoyancy, inertia, and density diffusion on the viscous retardation and displacement efficiency of the system. In addition we introduce a new computational technique to efficiently model the process.

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