



MEASURABILITY OF A SOLUTION TO
A FREE BOUNDARY PROBLEM
DESCRIBING SWELLING PHENOMENON
IN POROUS MATERIALS

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Abstract. In this paper we consider a one-dimensional free boundary problem as a mathematical model describing swelling phenomenon in one hole of a porous medium. This model is proposed by [5, 6] and consists of a partial differential equation for the water content in the hole and an ordinary differential equation of the front of water region which represents the growth rate for water region. For this model, in [5] we proved the existence and uniqueness of a time local solution and in [6] we showed the existence of a solution globally in time and the large time behavior of a solution. In this paper, we consider this mathematical model in each hole for each position x of the porous medium $\Omega \subset \mathbb{R}^3$, and establish the measurability of a solution to this problem with respect to $x \in \Omega$.

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