

A parameter identification problem in stochastic homogenization

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We consider the following problem that originates from porous media physics : from the sole knowledge of a handful of macroscopic quantities, is it possible to recover some relevant information in the microscale such as the probability distribution of the size of the channels between pores ?

We place ourselves in a discrete stochastic homogenization framework (in a lattice), and we parametrize the size distribution by two real numbers. We show that we can accurately identify them by solving a least square optimisation problem built solely with two macroscopic homogenized quantities. In particular, we show that the Newton algorithm we propose is robust even in the presence of small statistical noise induced by the forward problem.