

Modelling random porous media with chord functions

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We consider a two-phases model to describe a porous medium; an image of this medium, seen as a random level surface of a process X , is divided into two phases (pore and solid) according to whether X is less or greater than some threshold β . The statistical approach is made by observing the chord functions, i.e. the lengths of time intervals when X is in the same phase. Based on excursions theory, in particular on level crossings number, this work provides the exact formula of the chord-distribution functions and the two-point correlation function obtained from cross-sectional micrographs, proving in a rigorous way, as well as generalizing, some results published in the physical literature in the 90s (see for instance Berk, Teubner, Roberts or Torquato).

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