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Extraction of three-dimensional pore network and corner network with pores of high aspect ratios

Monday, 30 May 2022 17:05 (15 minutes)

The Euclidean distance map which is widely employed in thinning, transformation, expanding and locating of extraction algorithms cannot described the porous media with pores of high aspect ratios, since the hierarchy of the void voxels cannot be distinguished clearly by the Euclidean distance map. To address this issue, we propose a pore network extraction method based on the concept of the omnidirectional Euclidean distance, which is a set of Euclidean distances from a void voxel to all the accessible solid boundary voxels. Besides, the corner structure of porous media also plays an important role in the simulation of mass transfer flow. The existing models lack the extraction of corner network of real porous media. In this model, we propose an appropriate method to extract the corner network of porous media and couple it with the pore network of the main space. The proposed pore network extraction method is validated by comparing the pore network modeling results, in terms of the single-phase flow and the quasi-static two-phase drainage, against the direct numerical simulation results and the experimental data. The proposed pore network extraction method not only preserves the topological and morphological properties of the void spaces in porous media but also is robust and insensitive to the image noise.

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Participation

Online

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