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# Stochastic reconstruction of 3D porous media from a 2D thin slice

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Macroscopic transport properties of porous media essentially rely on the geometry and topology of their pore space. The premise of predicting these transport properties is to construct an accurate 3D pore space. A new method for reconstructing 3D porous media based on a 2D slice using the multiple-point statistics (MPS) is proposed. To validate the accuracy of the technique, Berea sandstone is chosen as the test sample. In the stochastic reconstruction process, a 2D thin section is taken as the training image and some pixels are extracted from it as the conditioning datum that must come from the centered region of a grain or pore. Then a new 2D thin section is generated using single normal equation simulation algorithm that is one of the most commonly used multiple-point statistical algorithms with the function of the simulation engine. After it, the generated image is set to the new training image and conditioning datum are anew selected from the new training image. Many 2D slices are generated by repeating the above mentioned processes. Last the stochastic porous media are generated through stacking these 2D slices. The real porous media obtained by micro-CT is used to compare the pore-space geometry and topology and transport properties with them of the reconstructed porous media. The comparison result shows that the reconstructed models are good agreement with the real model in the two-point correlation function, the pore and throat size distributions, and single- and two-phase flow permeabilities, which verifies the reliability of method.

## References

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