Contribution ID: **127** Type: **Poster Presentation**

Study on laboratory measurement method of anisotropic permeability based on passive differential pressure ratio

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Permeability is a key parameter to control material and energy transport in porous media. However, the anisotropy of permeability makes it difficult to measure accurately in laboratory. In this paper, a detailed theoretical analysis of the anisotropic porous media flow process is carried out, and it is found that all physical quantities exhibit point-centered symmetry during the one-dimensional stable displacement of anisotropic porous media, while a passive pore fluid pressure difference is generated in the vertical direction of displacement. For an anisotropic sample with unknown principal axes, there are systematic errors in the designed method for adopting Darcy's law directly or calculating the components of the permeability tensor using the outlet fluid production profile. For anisotropic porous media, the permeability tensor cannot be solved by a simple analytical formula because the flowing state of each internal part is not completely uniform, and a standard plate can be established to fit the solution.
On this basis, a two-dimensional and three-dimensional anisotropic permeability tensor test method based on the passive differential pressure ratio is established, and the two-dimensional and three-dimensional passive differential pressure ratio plates are given based on conventional plates and Gaussian process regression, respectively. The permeability tensor can be obtained by measuring the pressure difference perpendicular to the direction of displacement in the one-dimensional stable displacement process based on the constructed plots. The case test shows that the core test data are consistent with the theoretical analysis, and the method has high reliability and practicality.

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Time Block Preference

Time Block C (18:00-21:00 CET)

Participation

Online

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