

Boundary and Interface Conditions in Porous Media

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Correct specification of conditions at macroscopic surfaces of discontinuity and along the boundary is essential to the complete mathematical description of flow and transport in porous media. This work provides the framework for systematic derivation of appropriate conditions. It thereby allows for generalization of the conditions commonly in use and exposes the assumptions which underlie them. General balance equations for a zone separating two regions are simplified to the case where the regions are in good thermodynamic contact. By application, interface conditions for balance of mass, chemical species, momentum, and energy are obtained for (1) adjacent porous media containing the same fluid, (2) water flooding of an oil reservoir, (3) a salt water/freshwater interface, and (4) the boundary between a surface water body and the porous medium.