On a mathematical model of water flow in soils

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We propose an approach describing the flow of water in soils considering the soil as a porous media. To this aim we use a combination of the ideas by S. C. Cowin and J. W. Nunziato (1983) presenting the theory of porous media with those introduced by A. C. Eringen (1994) in the swelling theory. By means of an appropriate mathematical apparatus we show that the proposed mathematical model is well-posed. To this end we establish some uniqueness results concerning the solution of the initial boundary value problems associated with the considered model. We outline appropriate restrictions on the material coefficients that imply that the proposed model is well-posed and therefore, it can describe in a correct way the phenomenon of water flow in real soils.