

Abstract

Modelling one-dimensional flow process in unsaturated soils is usually based on the numerical solutions of the Richardss equation. Richardss equation may be expressed in water content form, pressure or mixed form. The objective of this paper is to test the accuracy of the results and the ability of the different forms of Richardss equation to describe the water flow in unsaturated soils. Implicit finite difference scheme is used in the numerical solution of the water content form and the pressure form of Richardss equation. The solution of the mixed form is obtained using the 1-D Hydrus software. The effect of texture and the initial moisture of the soil on the equation solutions are explored. The results show a significant difference under some conditions. The choice of the empirical model to describe the hydraulic properties like retention curve and hydraulic conductivity may play an important role on the performance of each form, and can lead to remarkably different simulation results. The accuracy of the results is established by comparing numerical results to the semi-analytical solution of Philip and confronting them to the measured results