Abstract

The Beerken infiltration test is introduced as a new experimental method, which involves collecting required information including soil moisture content (θ_0) , bulk density (ρ_b)and soil texture determination and applying the computational processes called BEST algorithms, can estimate soil hydraulic prameters Ks and S, the curve of the hydraulic conductivity ($K(\theta)$) and SWRC ($h(\theta)$). The computational algorithms are presented in Beerken infiltration called BESTslope, BESTsteady and BESTintercept. The results of this study, for 113 infiltration experiments in Sistan field and collecting all necessary information, shows that BESTsteady algorithm that has much simpler computing process in loam and sandy loam compared to two other algorithms, offers very satisfactory results in the estimation of Ks and S as well as moisture estimation in the SWRC and cumulative infiltration . In this research, a new simple method called Bsm was introduced, which can be used with satisfactory results like the BESTsteady algorithm to estimate Ks and S. The linear models CL and DL did not show satisfactory results generally. LOK method and IDW as two geostatistical methods have shown more satisfactory results for Ks estimation comparing to other geostatistical methods. In this research, the application of GLUE method with different combined likelihood and use of Monte Carlo-Latin squares to produce a set of parameters Ks, S, γ and β is applicable and has less error Er (t_i,I_i^{exp}) to estimate cumulative infiltration compared with the BESTslope algorithm. known as the original algorithm in Beerken infiltration. GSA sensitivity analysis show the Ks and S have less sensitivity than γ and β. The uncertainty estimation of the hydraulic conductivity curve ($K(\theta)$) in the 90% confidence interval is much less and close to zero. Uncertainty of estimation the average of the parameters γ and β with uniform frequency distribution is higher in comparison with Ks and S with frequency distribution are close to the normal. The stability of the saturation moisture content value (θs) and equal with porosity (ε) comparing with the variability of the θs value did not have a significant effect on the results obtained.

Keywords: Sorptivity,Relative error ,Soil water retention curve, soil hydraulic conductivity

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