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Comparison of Optimization and Two-point Methods in Estimation of Soil Water Retention Curve

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Soil water retention curve (SWRC) is one of the soil hydraulic properties in which its direct measurement is time consuming and expensive. Since, its measurement is unavoidable in study of environmental sciences i.e. investigation of unsaturated hydraulic conductivity and solute transport, in this study the attempt is to predict soil water retention curve from two measured points. By using Cresswell and Paydar (1996) method (two-point method) and an optimization method developed in this study on the basis of two points of SWRC, parameters of Tyler and Wheatcraft (1990) model (fractal dimension and air entry value) were estimated and then water content at different matric potentials were estimated and compared with their measured values (n=180). For each method, we used both 3 and 1500 kPa (case 1) and 33 and 1500 kPa (case 2) as two points of SWRC. The calculated RMSE values showed that in the Creswell and Paydar (1996) method, there exists no significant difference between case 1 and case 2. However, the calculated RMSE value in case 2 (2.35) was slightly less than case 1 (2.37). The results also showed that the developed optimization method in this study had significantly less RMSE values for cases 1 (1.63) and 2 (1.33) rather than Cresswell and Paydar (1996) method.