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FUNCTIONAL DESCRIPTION OF HYDROPHYSICAL SOIL PROPERTIES AND ITS VERIFICATION

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Three systems of functions are used to describe the water-retention capacity and the ratio of soil hydraulic conductivity to moisture filtration coefficient (relative hydraulic conductivity of soil). Every system uses an appropriate set of parameters that are common to the functions that make up this system. The functions of the first system have formal parameters and are used in the Mualem-Van Genuchten method. A physical-statistical interpretation is proposed for the parameters of two other systems, and the functions of these systems are considered as an alternative to the functions of the first system. The main purpose of the systems used is to predict the relative hydraulic conductivity applying parameters identified by the point approximation of data on the soil water-retention capacity. On the example of soil «2001 Silt «Columeia» from the Mualem catalog, the three systems of functions are compared. To do this, according to the Williams-Kloot criterion, the reliability of the differences between the errors of the compared functions is estimated for the point approximation of data on water-retention capacity, as well as for predicting the relative hydraulic conductivity of the soil. The significance of the influence of the additive parameter on the errors of the second and third systems of functions is estimated. The results of the study indicate the advantages of the functions of the second and third systems over the functions that are used in the Mualem-Van Genuchten method.

Key words: water-retention capacity, relative hydraulic conductivity, mathematical model, point approximation of experimental data, forecasting, Williams-Kloot criterion.