Abstract

The management of irrigated agricultural fields requires reliable information about soil hydraulic properties and their spatial variability. Geostatistical methods are useful for describing and understanding the spatial distribution of measured variables. In this study the kriging method was used to analyze spatial variability of three parameters of Kostiakov-Lewis infiltration equation (α, k and f_0) in Sistan Dam research field. For this purpose, 113 double rings experiments were made at each node of a 70m$\times$100m grid over the study area and Kostiakov-Lewis infiltration parameters were obtained. Three semivariogram model including spherical, exponential and Gaussian were fitted to the experimental semivariograms of the measured paramaters. Model selection for semivariogram was done with considering maximum of the coefficient of determination (r^2) and minimum residual sums of squares (RSS). Results showed that the Gaussian semivariogram model was the best-fitted model for α and k parameters with r^2= 0.567 and 0.781, respectively. Also results showed that f_0 does not show considerable spatial correlation over the study area. Given the best fitted semivariogram models parameters, spatial variability maps of α, k and f_0 were created using kriging method. We found that α generally has the largest amount in southern and northern parts of the study area. Also k has the largest amount in eastern and central parts and lowest amount in southern and north-western of the study area. The prepared spatial variability maps could be very useful to farmers so that each area within a field is managed appropriately.

Keywords: Infiltration rate, Kostiakov-Lewis equation, Spatial variability, Interpolation, Semivariogram, Kriging.

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