University of Zabol

Graduate school

Faculty of Water and Soil

Department of Water Engineering

The Thesis Submitted for the Degree of M.Sc (in the field of Water Engineering)

Estimation of Soil Water Retention and hydraulic conductivity functions using Soil Texture

Supervisors:

Dr. M. M. Chari

Dr. P. Afrasiab

Advisors:

Dr. M. Delbari

By:

E. Nakhaie

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holding capacity of light-textured soils. The fractal dimension is an intrinsic property of soil particles that is related to other soil properties. The correlation between fractal parameters and soil properties indicates the ability of fractal models to simulate soil hydraulic properties. In the results related to the calculation of λ, the lowest values obtained for the parameter λ were equal to 0.089 (corresponding to code 3120) and the highest value was equal to 0.513 (corresponding to code 3175). In the hmin calculation section, the minimum hmin value was equal to 0.018 (corresponding to codes 3224 and 3225) and the maximum value of hmin was 0.246 (corresponding to code 3204). It gives acceptable results in estimating the soil moisture curve of Brooks-Corey model (1964) for relatively coarse-textured soils with large values of λ and in high suctions, but near the saturation point, especially in fine-textured soils with small values. λ does not give good results. Due to the limited studies that have been done in this field, various suggestions such as the use of field measured data, the use of spectral transfer functions and research on a soil texture can be presented for future research.

Keywords: fractal, Wengnokhten model, Brooks-Curie model, soil texture.