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Evaluation of the linear infiltration equation by kinematic wave method in the surface irrigation

Supervisors:

Dr.P.Afrasiab

Dr.M.M.Chari

Co-Supervisor:

Dr.H.Piri

Preparation and Codification:

K.Arefi

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Abstract: Surface irrigation is considered as one of the most common irrigation methods in the world despite the formation of new irrigation methods, this method still has a special place among farmers and researchers. Many researchers have cited the low efficiency of this method as one of its weaknesses, while with proper design, implementation and management, its efficiency will increase significantly. For this purpose, we will need calculations to prevent water wastage in the farm as much as possible , Field and laboratory methods and their repetition in many cases impose very high costs; Therefore, various models are used to simulate different states and characteristics of water flow on the soil. In this research, the kinematic wave WALKER and HUMPHERYSE method has been used by numerical solution method. 5 series of water progress data by furrow method and 3 series of data by border method with soil texture diversity, various slopes and geometric and hydraulic characteristics of sections were studied and the model was programmed in MATLAB software.The linear diffusion equation was compared and concluded with Kostyakov and Philip equations. In light and sandy soils and on steep slopes.The linear method predicts the progress phase with high accuracy (absolute error of 7% and explanation coefficient of 0.99) and close to the Kostiakov method. The linear diffusion equation is used for modeling. Philip's method using the one-point method of Shepard et al. was not accurate enough. Border irrigation also predicts the progressive phase more accurately than furrow irrigation.

Keywords: surface irrigation, kinematic wave, linear intake equation, kostiakov equation, Philip equation,