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Chapter 12

A Mathematical Model for Control of Drainage in an Irrigation System

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Abstract Mathematical models describing the estimation of optimal amounts of water depend on various parameters such as the quality of soil that depends on many random factors. Investigation methods and approaches of the random processes of those parameters play an important role. In irrigation systems, drainage systems are widely used to achieve multiple objectives and it is necessary to pay attention to the choice of mathematical models that are adequately describing the processes of drainage and control of groundwater levels. An algorithm for the regulation and prevention of salinization of arable land and swampy areas in addition to an estimation of the amount of drainage water, have been proposed. Behaviour of the groundwater (temporal variation) is analysed applying the proposed model. Under the given conditions, it was derived that for an isotropic and homogeneous case, the level of the priming relative to axis x is approximately stable. A change in other parameters leads to the reduction of the effectiveness of drainage system and, consequently, to decreasing the level of water. Hence, using some engineering processes, it is necessary to increase the velocity of water through the drainage system.

Keywords Priming · Mathematical model · Drainage system · Non-linear equations · Regression models · Unknown parameters

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