预测湿润锋进程的新方法

A New Approach to Predict Wetting Front

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中文关键词：土层初始含水量;入渗模型;入渗速率;累积入渗量

英文关键词：Initial soil moisture content Infiltration model Infiltration rate Accumulative infiltration

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中文摘要：

本文根据Darcy定律和水量平衡原理建立了一种能计算土层初始含水量不均匀的入渗过程的Green—Ampt模型。传统的Green—Ampt模型成为该模型在土层初始含水量均匀情况下的一个特例。本模型除了可直接用于土层水分入渗过程外,稍加修改便可用于多孔介质中液体的扩散过程计算和模拟。

英文摘要：

In the course of water infiltration into soil, the most important factors that influence the infiltration rate and accumulative infiltration are soil physical properties and soil water movement parameters. And uniformity of soil is more influential because it not only could present the natural state of soil, but also can indicate whether a tillage method is appropriate to that soil or not. Therefore it is always highly recognized in the field of tillage. But, the establishment of modern till conception makes water conservation effect of till and soil collectivity of rainfall more acceptable than the uniformity of soil and they are taken to be an important index to evaluate tillage methods. As a result, more and more analysis have concentrated to wetting front that relate to infiltration rate and accumulative infiltration.In this study, an infiltration model of Green-Ampt type has been derived on the basis of Darcy's law and law of water conservation. The improved model is more general than the conventional one. Also, it can be applied to solve the problem of liquid movement in porous media.Although conventional Green-Ampt model is simple in form and easy to compute, it can only be applied to the situation in which initial moisture content is uniform. Also, there is a gap between the actual state of soil and the model conditions. On the other hand, the improved model in this study can be used to compute infiltration rate and accumulative infiltration at almost any initial moisture content so long as it can be formulated in elementary functions.

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