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SOME APPLICATIONS OF THE ALTERNATING-DIRECTION IMPLICIT METHOD TO WATER INFILTRATION PROBLEMS. H. M. Selim* and Don Kirkham, Ames. Water infiltration in two-dimensional flow regions (unsaturated soils) is solved by use of a finite difference approximation and the Alternating-Direction Implicit (ADI) method. The ADI method utilizes two simultaneous systems of difference equations that represent the partial differential equation describing water infiltration. The solution of the problem is given by alternate use of the two systems of difference equations. The ADI method is used to solve the problem of water infiltration for four geometries of the flow region, two boundary conditions, and for two soils. From the numerical results obtained we conclude that the ADI method, which is 7 to 25 times faster than some other methods, proves flexible for changes in geometry and boundary conditions of the flow region; and valuable for use with modern digital computers to solve water infiltration problems.

Mathematics