Review of HYDRUS-1D

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HYDRUS-1D is one of the most widely used codes for unsaturated flow and solute transport modeling. It is a finite element model that solves Richards' equation for flow. It has options for nonisothermal liquid and vapor flow and heat transport. Constitutive relationships include van Genuchten and Brooks-Corey water retention functions. Information on soil texture can be used along with pedotransfer functions to determine water retention and hydraulic conductivity parameters. The code includes inverse modeling capabilities for estimating hydraulic and transport parameters. The upper boundary condition includes standard constant pressure and constant flux conditions in addition to meteorological forcing. Options for the lower boundary condition include unit gradient and seepage face.

Developed as a collaborative effort of the U.S. Salinity Laboratory and University of California at Riverside, HYDRUS-1D is computationally efficient, well-supported, continually updated, and available free of charge. A graphical user interface can be used for data input and to view simulation results. The code has been used to solve a wide variety of problems, such as the direct and inverse examples provided with the code, and also water balance modeling, recharge estimation, engineered cover performance, nitrate and pesticide leaching, and chlorinated hydrocarbon transport. A 2-D version of the code is also available. New features being tested include virus transport, colloid and colloid-facilitated transport, and preferential flow. Technical documentation includes a theory manual, online help, and tutorials, all available on the Web site where the code may be downloaded at www.mines.edu/~igwmc by selecting "Software," "H," then "HYDRUS-1D."

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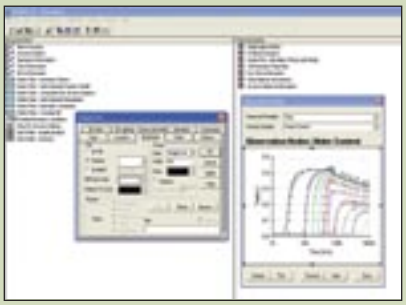
HYDRUS-1D Software Review



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Application: Unsaturated zone flow and transport

Best Feature: Wide range of capabilities

GUI:

Output/Plotting:

Documentation:

Speed:

Worst Feature: Error reporting

OVERALL RATING:

Rating System for graphics:

Excellent
Very Good
Good
Satisfactory
Poor

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