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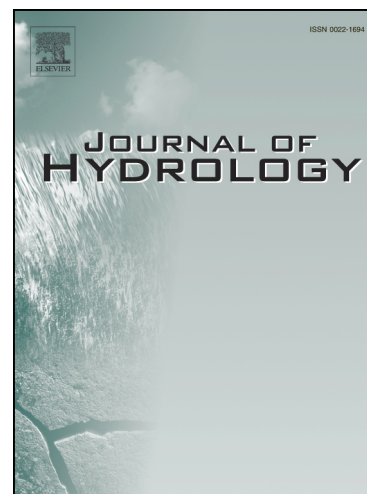
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Semi-analytical solution to one-dimensional advective-dispersive-reactive transport equation using homotopy analysis method

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Abstract: The one-dimensional advective-dispersive-reactive transport equation has been widely applied to describe the transportation process of landfill leachate through liners or anti-seepage curtains. However, most existing methods solving this problem are limited to simple initial conditions. In order to eliminate these limitations, homotopy analysis method (HAM) is implemented to solve the contaminant transport model in this paper. Applying auxiliary linear and nonlinear operator, zero order deformation equation is developed to solve contaminant transport problems numerically, with smooth initial conditions and variable source concentration being considered. HAM has been applied to simulate different contamination transport problems in one-dimensional space reported in literature. Good agreement between HAM solutions and analytical solutions has been achieved for all cases considered, demonstrating the feasibility of HAM to solve the contaminant transport model with more general, smooth initial conditions.

Key words: homotopy analysis method; contaminant; transport; initial condition

Declarations of interest: none

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