

Numerical Solution of Two-Dimensional Solute Transport System Using Operational Matrices

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Abstract : In this study, the numerical solution of two-dimensional solute transport system in a homogeneous porous medium of finite-length is obtained. The considered transport system have the terms accounting for advection, dispersion and first-order decay with first-type boundary conditions. Initially, the aquifer is considered solute free and a constant input-concentration is considered at inlet boundary. The solution is describing the solute concentration in rectangular inflow-region of the homogeneous porous media. The numerical solution is derived using a powerful method viz., spectral collocation method. The numerical computation and graphical presentations exhibit that the method is effective and reliable during solution of the physical model with complicated boundary conditions even in the presence of reaction term.

Keywords : two-dimensional solute transport system, spectral collocation method, Chebyshev polynomials, Chebyshev differentiation matrix

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