

Two dimensional solute transports for unsteady flow through inhomogeneous semi-infinite porous domain: Dispersion being proportional to square of velocity

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In the present work, analytical solution of two-dimensional solute transport for pulse type input point source of uniform nature along the unsteady flow through inhomogeneous semi-infinite porous medium along longitudinal and transverse directions. According to Scheidgger (1957), dispersion is considered directly proportional to the square of velocity as the linear spatially dependent function defining the inhomogeneity and temporally dependent function in both the directions. It is expressed in degenerate form. Initially the domain is solute free. The input condition is considered continuous type and introduced at the origin of the domain and other is considered flux type at the end of the domain. Certain new independent variables are introduced through separate transformation to eliminate the variable coefficients of Advection Diffusion Equation into constant coefficient. Then Laplace transform technique (LTT) is used to get the analytical solution of ADE. The solution in all possible combinations of increasing or decreasing temporally and spatially dependence is compared with each other with the help of graph.

Biography

Dr. Atul Kumar has completed his Ph.D. at the age of 26 years from Department of Mathematics, Faculty of science, Banaras Hindu University, Varanasi and working as a Post Doctoral Fellow from Department of Mathematics & Astronomy, Lucknow University, Lucknow. He has published more than 14 papers in reputed journals.

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