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**Mathematical Analysis of Transport of Pollutants in Three Dimensional Advection - Diffusion Equation with Radioactive Decay**

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**Abstract**

Contaminants of the subsurface has greatly invigorating research of solute transport of pollutants phenomena in porous media. The transport of pollutant in the subsurface is explained using Advection-Dispersion Equation (A D E) has been derived from the mass balance principle. In the deterministic approach with transport parameters independent of position and time the A D E can be derived for linear and explicit solutions. Many of the solutions for solute transport using A D E are available for a more number of initial conditions and boundary conditions for one-dimensional solute transport and a less number for three-dimensional transport models. Wide variations in flow properties and transport in the field, the nature of the flow system and nonideal nature of initial conditions and boundary conditions, the functionality of analytic solution is limited method and numerical method may be needed. Still, analytic solutions remain useful for validating numerical result, sensitivity analyses to evaluate the various effects of transport parameter, providing that the initial estimate of pollution scenario, and purposes over a large time or distances where the use of numerical models becomes impractical.

**Keywords:**

Validating numerical result, Transport parameter, Validating numerical result, Pollution scenario

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