

Abstract

A one dimensional mass transport equation whose solution is ill-posed is considered to model flow of solutes in porous medium. The diffusion coefficient and advection velocity in the governing partial differential equation (PDE) are first taken constant and secondly linearly time dependent and not proportional to each other. Flow domain is assumed semi infinitely deep and homogeneous and it is subdivided into small units called control volumes of uniform dimension. Finite volume and Finite difference methods are used to discretize space and time respectively in the governing PDE. Discretized equations are inverted to obtain the concentrations at various nodes of the control volumes by using mathematical codes developed in Mat-lab and the results presented using graphs at different soil depths and time to determine the parameters that can help detect the contamination levels before disastrous levels are reached and with ease. It is observed that the concentration levels of ions with depth and time can easily be detected when diffusion coefficient and advection velocities are linearly depended on time.