

Abstract

The stream water quality model of water quality assessment problems often involves numerical methods to solve the equations. The governing equation of the uniform flow model is one-dimensional advection-dispersion-reaction equations (ADRE). In this project, a better finite difference scheme for solving ADRE is focused and the effect of non-uniform water flows in a stream is considered. Two mathematical models are used to simulate pollution due to sewage effluent. The first is a hydrodynamic model that provides the velocity field and elevation of the water flow. The second is a advection-dispersion-reaction model that gives the pollutant concentration fields after input the velocity data from the hydrodynamic model. For numerical techniques, we used the Crank-Nicolson method for system of a hydrodynamic model and the explicit schemes to the dispersion model. The revised Saul'yev schemes are modified from two computation techniques of uniform flow stream problems: forward time central space (FTCS) and modified Saul'yev schemes for dispersion model. A comparison of both schemes regarding stability aspect is provided so as to illustrate their applicability to the real-world problem.

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