

Abstract

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Using group theoretic method to solve multi-dimensional diffusion equation

The nonlinear diffusion equation arises in many important areas of science and technology such as modeling of dopant diffusion in semiconductors. We give analytical solution to N-dimensional radially symmetric nonlinear diffusion equation of the form where $C(r,t)$ is the concentration and $D(C)$ is diffusion coefficient. The transformation group theoretic approach is applied to present an analysis of the nonlinear diffusion equation. The one-parameter group transformation reduces the number of independent variables by one and the governing partial differential equation with the boundary conditions reduce to an ordinary differential equation with the appropriate boundary conditions. Effect of the time "t" and the number of dimension "N" on the concentration diffusion function $C(r,t)$ has been studied and the results are plotted.