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[Keynote Talk]: Analysis of One Dimensional Advection Diffusion Model Using Finite Difference Method

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Abstract : In this paper, one dimensional advection diffusion model is analyzed using finite difference method based on Crank-Nicolson scheme. A practical problem of filter cake washing of chemical engineering is analyzed. The model is converted into dimensionless form. For the grid $\Omega \times \omega = [0, 1] \times [0, T]$, the Crank-Nicolson spatial derivative scheme is used in space domain and forward difference scheme is used in time domain. The scheme is found to be unconditionally convergent, stable, first order accurate in time and second order accurate in space domain. For a test problem, numerical results are compared with the analytical ones for different values of parameter.

Keywords : Crank-Nicolson scheme, Lax-Richtmyer theorem, stability, consistency, Peclet number, Greschgorin circle
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