ANALYTICAL SOLUTION OF THE DIFFUSION - CONVECTION EQUATION OVER A FINITE DOMAIN.

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Abstract: The diffusion-convection equation arises in a number of physical problems in engineering including migration of contaminants in a stream, smoke plume in atmosphere, dispersion of chemicals in reactors, tracer dispersion in a porous medium, etc. Numerical solutions to the diffusion-convection equation are usually evaluated through comparison with analytical solutions in one dimension. Literature survey indicates the most frequently used analytical solution is one derived for a semi-infinite domain. The paper presents an analytical solution to this problem over a finite domain. Comparison is made with a solution to a mathematically similar problem in heat conduction with radiation.