SCOPE AND OBJECT OF THE THESIS

One will always recognize that solution of the various problems in the theory of Radiative Transfer lead to the solutions of Integrodifferential equations . One can not expect that the exact and complete solution of all the problems will be feasible. Various authors have studied these equations of Radiative Transfer with two objectives in view, one is to obtain good approximate solutions (for practical purpose) of the equations of Radiative Transfer , and the other to obtain exact solutions of the same for the angular distribution of the emergent radiation and the radiation at any optical depth . In the present work we have taken up the second objective . For this purpose , Laplace transform method in combination with Wiener-Hopf technique has been adopted and it is our aim to show that this method is as powerful as the other exact methods (discussed in the general introduction) such as Principle of Invariance, Case's Eigen function expansion method ,...... in obtaining an exact solution for theemergent intensity and also the intensity distribution in different directions at any optical depth (by inversion) in a semi- infinite plane parallel atmosphere .

It may be mentioned that the Laplace transform method in combination with Wiener-Hopf technique can be successfully applied to the exact solution of equations of the finite atmosphere problem of Radiative Transfer or the finite slab problem of Neutron diffusion (we have not considered these problems in the thesis) in view of the new representation of Chandrasekhar's H-function H(z) (1977, Dasgupta) as the sum of two functions , one- a rational function havigg a simple pole at $z = -K_c < -1$ and the other- an analytic function of z regular on (-1,0) . Dasgupta has developed a technique (not yet published) for finding the exact intensity of radiation in finite atmosphere through unique solution of a pair of coupled linear singular integral equation by Wiener-Hopf technique interms of Fredholm Integral equation admitting of an exact unique solution by iteration .

These coupled linear integral integral equations are derived from the integrodifferential equation directly by Laplace transformation . As a matter of fact we have solved the General Rayleigh scattering problem in planetary atmosphere by the above mentioned method . The paper has not been included in the thesis because of its large volume .