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Title of the thesis: A Study of Boundary Layer Flows and Heat Transfer over
Stretching/Moving Surfaces

ABSTRACT

The present thesis entitled “**A Study of Boundary Layer Flows and Heat Transfer over Stretching/Moving Surfaces**” contains six chapters. First chapter is of introductory nature and presents the objective and scope of the thesis. A detailed literature survey of stretching sheet problem relevant to the thesis is also presented in the chapter.

Chapter-2 (Radiation Effects on Boundary Layer Flow of Nano-fluids Cu-water and Ag-water over a Stretching Plate with Convective Surface Boundary Condition), we examine the steady laminar boundary layer flow of nano-fluids Cu-water and Ag-water past a stretching plate with convective surface boundary condition in the presence of thermal radiation. The present flow belongs to the category of boundary layer flow of Sakadias type. The closed form solution has been obtained for convective heat transfer under the given condition. The main thrust of our study is to read the following:

- a) effect of radiation parameter on the convective heat transfer, and
- b) the effect of volume fraction of nano-sized particles of Cu in Cu-water and Ag in Ag-water, nano-fluids.

The skin friction and Nusselt number both have been calculated and the possible effect of related parameters has been studied.

Chapter-3 (Radiation Effects on Unsteady Boundary Layer Flow of nanofluids Cu-water and Ag-water over a Stretching Plate and Heat Transfer with Convective Boundary Condition), we deal with unsteady laminar boundary layer flow of nano-fluids Cu-water and Ag-water past a stretching plate with convective surface boundary condition in the presence of thermal radiation. The present flow belongs to the category of boundary layer flow of Sakiadis type. The closed form solution has been obtained for convective heat transfer under the given conditions. The main thrust of our study is to read the following :

- a) effect of radiation parameter on the convective heat transfer,
- b) the effect of volume fraction of nano-sized particles of Cu in Cu-water and Ag in Ag-water nano-fluids, and
- c) the time dependence of temperature field and Nusselt number.

Chapter-4 (Radiation effects on boundary layer flow of nano-fluids Cu-water and Ag-water over a stretching plate with suction and Heat transfer with convective surface

boundary), we deal with boundary layer flow of nano-fluids Cu-water and Ag-water past a stretching plate with suction and heat transfer with convective surface boundary condition in the presence of thermal radiation. This flow belongs to the boundary layer flow of Sakiadis type. A closed form solution has been obtained for convective heat transfer under the given conditions. We study the following in this chapter:

- a) Flow field with suction on stretching surface,
- b) the effect of volume fraction of nano-sized particles of Cu in Cu-water and Ag in Ag-water, nano-fluids on temperature field, and
- c) the effect of suction parameter on the convective heat transfer.

The skin friction and Nusselt number both have also been calculated and the possible effect of related parameters has been studied.

Chapter-5 (Radiation effects on unsteady boundary layer flow past a stretching plate and heat transfer with suction and convective surface boundary condition), we analyse unsteady laminar boundary layer flow of nano-fluids Cu-water and Ag-water past a stretching plate with suction and convective surface boundary condition in the presence of thermal radiation. The flow which has been considered here is of Sakiadis type. A closed form solution has been obtained for convective heat transfer under the given conditions. The main aim of our study is to analyse the following:

- a) effect of radiation parameter on the convective heat transfer,
- b) the effect of volume fraction of nano-sized particles of Cu in Cu-water and Ag in Ag-water, nano-fluids,
- c) effect of suction parameter on the convective heat transfer, and
- d) the time dependence of temperature field.

Chapter-6 (Boundary layer flow of viscous fluid over a general exponential stretching sheet and heat transfer with suction and convective surface boundary condition), we deal with the steady laminar boundary layer flow of viscous fluid past a general exponentially stretching sheet with suction and convective surface boundary condition. Using Similarity transformations the governing partial differential equations has been reduced to the ordinary non-linear differential equations. Using shooting and Runge Kutta fourth order method, we obtain the flow and temperature fields and we read the following:

- a) behaviour of flow field due to general exponential stretching sheet,
- b) effect of radiation parameter on the convective heat transfer,
- c) effect of suction parameter on the convective heat transfer, and
- d) effect of Prandtl's number on the heat transfer profile.