Preface

The understanding of the fluid mechanics of lakes and reservoirs has expanded rapidly in recent years, owing to the importance of fluid dynamical processes for determining the quality of water supply. In particular, processes that give rise to vertical transport of water properties have received considerable attention. An example of a limnological situation where such processes play a part in the overall dynamics is differential heating or cooling which occurs when neighbouring regions of the same water body are heated or cooled relative to each other.

Thermosyphons, a prescribed circulating fluid system driven by thermal buoyancy forces, have a large body of literature. The understanding of the stability of thermosyphons are the issues that will be examined in Chapters 2 and 3 of the thesis.

The first chapter of this thesis reviews the natural convection flows between accelerating walls and thermosyphons.

In Chapter 4 the effect of an applied transverse magnetic field on the two dimensional free convective flow in a parallel walled cell with vertical walls at non - uniform temperature is studied.

In Chapter 5, we consider the stability of magnetohydrodynamic flow between two accelerating walls.

In the above two chapters, the problems are modelled in such a way that the problems admit similarity solutions. Asymptotic results in the limiting case of small Reynolds number are obtained for the flow between accelerating walls and the steady state solutions are discussed numerically.