PREFACE

The present dissertation entitle "Application of Variational Inequality in Option Pricing" have been written under the supervision of Dr. S. C. Gupta, Reader, Department of Mathematics (Women’s College), Aligarh Muslim University, Aligarh. The theory of variational inequalities introduced by G. Fichera and G. Stampacchia, independently in early sixties to study the problems in potential theory and mechanics respectively. The theory of variational inequalities is a well established tool to solve problems from mechanics, engineering, operations research, optimization, game theory and economics. In this dissertation I have studied the applications of variational inequalities in option pricing.

The dissertation comprises five chapters and each chapter is subdivided into various sections. In Chapter-I, a brief survey of option pricing and variational inequalities is presented. All the basic definitions, notations and results which are essential for the presentation of the subsequent chapters have also been reviewed. Chapter-II deals with the Blacks-Scholes model, which provides rich insight into the valuation of debt relative to equity and determined the equilibrium value of an option. In Chapter-III we discuss briefly the modeling of European and American options depending on history of asset price. In Chapter-IV a brief survey of evolution of variational inequality is presented. Chapter-V contains a modeling of American options through variational inequality.

Definitions, problems, inequalities, results in the text have been specified with double decimal number. For example inequality (4.3.1) refers to the first inequality appearing in the third section of the fourth chapter.

In the end a list of references of the literature consulted has been given.