

CONTENTS

	<u>PAGE</u>
SUMMARY	1
CHAPTER I : INTRODUCTION.	
(1.1) Electrohydrodynamics.	6
(1.2) Surface Tension and Adsorption... ..	13
(1.3) The concept of "Marangoni instability"... ..	28
(1.4.a) The Rayleigh-Taylor model.	29
(1.4.b) The Kelvin-Helmholtz model.	33
CHAPTER II : ELECTROHYDRODYNAMIC MARANGONI STABILITY IN KELVIN-HELMHOLTZ FLOW, THE CASE OF A TANGENTIAL ELECTRIC FIELD.	
(2.1) Introduction.	37
(2.2) Formulation of the problem... ..	40
(2.3) Perturbation analysis.... ..	48
(2.4) Solution of perturbation equations... ..	55
CHAPTER III : LINEAR ELECTROHYDRODYNAMIC MARANGONI STABILITY.	
(3.1) Introduction.	65
(3.2) The Rayleigh-Taylor instability.. ...	66
(3.3) The Kelvin-Helmholtz instability.	71
CHAPTER IV : NONLINEAR ELECTROHYDRODYNAMIC MARANGONI STABILITY; THE NONLINEAR SCHRÖDINGER EQUATIONS.	
(4.1) Introduction.	77

	<u>PAGE</u>
(4.2) Nonlinear Schrödinger equation with complex coefficients.	78
(4.3) The cutoff wavenumber and surface elevation	82
(4.4) Stability condition of the nonlinear Schrö- dinger equation with complex coefficients..	87
(4.5) The nonlinear Rayleigh-Taylor instability..	89
(4.6) The nonlinear Kelvin-Helmholtz instability.	99
CHAPTER V : STABILITY AT THE CRITICAL POINT; THE NON- LINEAR KLEIN-GORDON EQUATION.	
(5.1) Introduction.	108
(5.2) Nonlinear Klein-Gordon equation with complex coefficients.	109
(5.3) Stability conditions of the Klein-Gordon equation.	115
CHAPTER VI : ELECTROHYDRODYNAMIC MARANGONI STABILITY IN KELVIN-HELMHOLTZ FLOW. THE CASE OF A NORMAL FIELD IN THE ABSENCE OF SURFACE CHARGES.	
(6.1) Introduction.	123
(6.2) Formulation of the problem and perturbation analysis.	123
(6.3) Linear stability theory.	132
(6.4) Nonlinear stability theory... ..	140
(6.5) Stability at the critical point..	164
APPENDIX.	167
REFERENCES.	180