

## CONTENTS

|                                                                 |    |
|-----------------------------------------------------------------|----|
| INTRODUCTION .....                                              | 1  |
| CHAPTER I. DYNAMICAL EQUATIONS FOR NON-LINEAR FLUIDS.....       | 2  |
| I.1- KInematics of flow.....                                    | 3  |
| I.2- Equation of continuity.....                                | 5  |
| I.3- Conservation of momentum.....                              | 6  |
| I.4- Conservation of angular momentum.....                      | 7  |
| I.5- Conservation of energy.....                                | 9  |
| I.6- The constitutive equations.....                            | 9  |
| CHAPTER II. DYNAMICS OF FLOW.....                               | 16 |
| II.1- Kinematics,equation of motion.....                        | 16 |
| II.2- Method of approximation.....                              | 19 |
| II.3- First order approximation.....                            | 22 |
| II.4- Second order approximation.....                           | 23 |
| II.5- Third order approximation.....                            | 25 |
| CHAPTER III. SOLUTION OF THE EQUATION OF MOTION.....            | 28 |
| III.1- Determination of the Green's function....                | 28 |
| III.2- Determination of the first order<br>velocity $v_1$ ..... | 31 |
| III.3- Determination of the third order<br>velocity $v_3$ ..... | 33 |
| CHAPTER IV. RESULTS AND DISCUSSION.....                         | 41 |
| REFERENCES.....                                                 | 56 |