ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF MATHEMATICS

SEMINAR REPORT

ON

STABILITY IIN NON-LINEAR ORDINARY DIFFERENTIAL EQUATIONS

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Preface

Many important physical problems arising in Engineering and applied science are modelled directly or indirectly by ordinary differential equations which are actually non-linear. Therefore, the paper is concerned with solutions of initial value problems for non-linear differential equations. So emphasis is given on non-linear phenomena and properties, particularly those with physical relevance. The paper treat basic ideas and methods of the qualitative theory that are suitable for the study of stability and boundedness of solutions of non-linear ordinary differential equations. In general it contains three chapters.

In the first chapter following some preliminary considerations theory of stability in linear systems is discussed because linear systems is so well developed and in addition the results in this chapter are fundamental component of the second chapter. The second chapter treats stability in non linear equations and focuses on indirect methods or techniques to determine stability of constant (equilibrium) solutions. In the third chapter Lyapunov stability theory is discussed from physical point of view with examples. Finally the paper is also a product of my desire to see that differential equations are an essential element of applied mathematics with a wide range of applications.

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