CONTENTS

PART I. GENERAL THEORY

I. Basic Concepts

1.1 Preliminary Remarks 3
1.2 Floquet's Theorem 3
1.3 The Symmetric Case $Q(x) = Q(-x)$ 8

II. Characteristic Values and Discriminant

2.1 Characteristic Values and Intervals of Stability 11
2.2 Analytic Properties of the Discriminant 19
2.3 Infinite Determinants 28
2.4 Asymptotic Behavior of the Characteristic Values . . . 36
2.5 Basic Results from the general Theory of Linear Differential Equations 43
2.6 Theorems of Liapounoff and Borg. Fourier Transforms . . 46

PART II. DETAILS

III. Elementary Formulas

3.1 Transformation into a Standard Form 51
3.2 The Liouville Transformation 51
3.3 Polar Coordinates 53
3.4 Differential Equation for the Product of Two Solutions . . 54

IV. Oscillatory Solutions 56

V. Intervals of Stability and Instability

5.1 Introduction 64
5.2 Regions of Absolute Stability 66
5.3 Equations with Two or More Parameters 71
5.4 Remarks on a Perturbation Method 72
5.5 Applications of the Theory of Systems of Differential Equations 74
5.6 The Instability Intervals 75

VI. Discriminant 79

VII. Coexistence
7.1 Introduction 90
7.2 Ince's Equation 92
7.3 Lamé's Equation and Generalizations 103
7.4 The Whittaker-Hill Equation 106
7.5 Finite Hill's Equations 107
7.6 Extreme Cases of Coexistence 111

VIII. Examples
8.1 Impulse Functions 114
8.2 Piecewise Constant Functions 115
8.3 Piecewise Linear Functions 117
8.4 The Frequency Modulation Equation 118

List of Symbols and Notations 120
List of Theorems, Lemmas, and Corollaries 121
References 122
Index 126