

# CONTENTS

## Preface

vii

## **Chapter I. Introduction**

1.1	The Second Fundamental Form	1
1.2	The First Variational Formula	7
1.3	Minimal Submanifolds in Euclidean Space	11
1.4	Minimal Submanifolds in the Sphere	15
1.5	Examples	18
1.6	Rigidity Theorems	24
1.7	Exercises	36

## **Chapter II. Bernstein's Theorem and Its Generalizations**

2.1	Gauss Map	39
2.2	The Weierstrass Representation	45
2.3	The Value Distribution of the Image under the Gauss Map	56
2.4	Exercises	71

## **Chapter III. Weierstrass Type Representations**

3.1	The Representation for Surfaces of Prescribed Mean Curvature	73
3.2	The Representation for CMC-1 Surfaces in $\mathbb{H}^3$	78
3.2.1	The Minkowski model for $\mathbb{H}^3$	78
3.2.2	The matrix model for $\mathbb{H}^3$	80
3.2.3	CMC-1 surfaces in $\mathbb{H}^3$	82
3.2.4	Hyperbolic Gauss maps	89
3.3	Exercises	96

## **Chapter IV. Plateau's Problem and Douglas-Rado Solution**

4.1	Mathematical Formulation	97
4.2	The Dirichlet Principle	102
4.3	Proof of the Main Theorem	105

<b>Chapter V. Minimal Submanifolds of Higher Codimension</b>	<b>113</b>
5.1 Kähler Geometry and Wirtinger's Inequality	113
5.2 Special Lagrangian Submanifolds	124
5.2.1 Algebraic preliminaries	124
5.2.2 Special Lagrangian submanifolds	128
5.2.3 Examples	134
5.3 Exercises	142
<b>Chapter VI. Stable Minimal Hypersurfaces</b>	<b>143</b>
6.1 The Second Variational Formula	144
6.2 Stable Minimal Hypersurfaces and Applications	153
6.3 A Classification of Certain Stable Minimal Surfaces	161
6.4 Stable Cone and Bernstein's Problem	168
6.5 Curvature Estimates for Minimal Hypersurfaces	176
6.6 Exercises	186
<b>Chapter VII. Bernstein Type Theorems for Higher Codimension</b>	<b>187</b>
7.1 Geometry of Grassmannian Manifolds	188
7.2 Harmonic Gauss Maps	207
7.3 Bernstein Type Theorems	214
<b>Chapter VIII. Entire Space-Like Submanifolds</b>	<b>221</b>
8.1 A Bochner Type Formula	224
8.2 The Gauss Image	227
8.3 Estimates of the Second Fundamental Form	233
8.4 Completeness	237
8.5 Bernstein's Problem	244
8.6 Final Remarks	250
<b>References</b>	<b>251</b>
<b>Index</b>	<b>259</b>