## **CONTENTS**

	1 1/	EIACE	17	
	IN	TRODUCTION	xi	
	NC	MENCLATURE	xvii	
1	BASIC EQUATIONS OF CONVECTIVE HEAT TRANSFER			
	1.1	Initial Remarks	1	
	1.2	The Continuity, Momentum, and Energy Equations	3	
	1.3	Equations for the Turbulent Transport of Heat and Momentum	9	
		Initial and Boundary Conditions	13	
	1.5	Similarity Analysis of Mixed Convection	17	

DDEENCE

vi CONTENTS

2	BASIC INFORMATION ON THE THEORY OF TURBULENT HEAT TRANSFER IN FLOW			
	NEAR WALLS	27		
	2.1 Introductory Remarks	27		
	2.2 Turbulent Flows in the Absence of Gravity	28		
	2.3 Free Convection along a Vertical Surface	41		
3				
	MIXED CONVECTION	57		
	3.1 Introductory Remarks	57		
	3.2 Combined LFF Convection in a Boundary Layer	58		
	3.3 Combined LFF Convection in Channels	68		
4	TURBULENT MIXED CONVECTION			
	IN BOUNDARY LAYERS	91		
	4.1 Fundamentals of the Theory of Thermally Stratified Turbulent Flow	91		
	4.2 Flow and Heat Transfer in a Horizontal Boundary Layer	98		
	4.3 Flow and Heat Transfer in a Vertical Boundary Layer	109		
5	TURBULENT FLOW AND HEAT TRANSFER			
	IN HORIZONTAL CHANNELS	115		
	5.1 Flow and Heat Transfer in Plane Channels	115		
	5.2 Flow and Heat Transfer in Circular Pipes	131		
6	TURBULENT FLOW AND HEAT TRANSFER			
	IN VERTICAL CHANNELS	147		
	6.1 Introductory Remarks	147		
	6.2 Boundaries for the Effect of Buoyancy	148		
	<ul><li>6.3 Heat Transfer for Stable Density Distribution in the Channel</li><li>6.4 Heat Transfer when the Density Distribution in the Channel is</li></ul>	156		
	Unstable	179		
7	GRAVITATIONAL EFFECTS ON HEAT			
•	TRANSFER IN A SINGLE-PHASE FLUID			
	NEAR THE CRITICAL POINT	183		
	7.1 Heat Transfer at Supercritical Pressures	183		

7.2 Heat Transfer in Vertical Channels	186
7.3 Heat Transfer in Horizonal Channels	196
REFERENCES	203
ADDITIONAL REFERENCES	211
INDEX	213

CONTENTS

vii