

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION	1
References	12
CHAPTER 2. A SIMPLE MODEL OF BINARY ALLOYS	14
2.1. Ising Model for Binary Alloys	14
2.2. Coarse-Grained Free Energy Functional	21
2.3. Calculations of the Helmholtz Free Energy Functional	24
2.3.1. Monte Carlo Studies	24
2.3.2. Field Theory Renormalization Group	31
References	32
CHAPTER 3. DYNAMICAL MODEL OF BINARY ALLOYS	34
3.1. Master Equation	35
3.2. Langevin Equations. Model "A" and "B"	40
3.3. Equations of Motion for the Nonequilibrium Correlation Functions	43
3.3.1. Equation of Motion for the One-Point Function	43
3.3.2. Equation of Motion for the Two-Point Function	45
References	47
CHAPTER 4. THE CLASSICAL THEORY OF NUCLEATION	49
4.1. Equilibrium Properties of the Classical Droplet Model	49
4.2. Becker-Döring Theory	52
References	58
CHAPTER 5. FIELD THEORY OF NUCLEATION : STATICS	59
5.1. Derivation of the Drumhead Model Hamiltonian	59
5.2. Essential Singularity of the Free Energy	70
References	83
CHAPTER 6. FIELD THEORY OF NUCLEATION : DYNAMICS	84
References	92
CHAPTER 7. THEORIES OF SPINODAL DECOMPOSITION	93
7.1. Linear Theories	93
7.2. The Langer, Bar-on, Miller Theory	95
References	106

CHAPTER 8. LIFSHITZ-SLYOZOV LATE STAGE GROWTH THEORY	108
8.1. Nonlinear Equations of Motion	108
8.2. Asymptotic Solution	111
References	115
CHAPTER 9. KINETIC DRUMHEAD MODEL FOR NONCONSERVED ORDER PARAMETER	116
9.1. Allen-Cahn Deterministic Equation	116
9.2. Langevin Equations	119
References	125
CHAPTER 10. DYNAMICAL SCALING	126
References	140