

## CONTENTS

CONTRIBUTORS . . . . .	ix
PREFACE . . . . .	xi

### Digital Techniques in Electron Off-Axis Holography

G. ADE

I. Introduction . . . . .	1
II. Electron Off-Axis Holography . . . . .	6
III. Problems of Off-Axis Holography . . . . .	25
IV. Examples of Applications . . . . .	36
V. Conclusions and Future Prospects . . . . .	47
References . . . . .	48

### Optical Symbolic Substitution Architectures

M. S. ALAM AND M. A. KARIM

I. Introduction . . . . .	53
II. Optical Symbolic Substitution . . . . .	54
III. Coding Techniques . . . . .	58
IV. Signed-Digit Arithmetic Using OSS . . . . .	59
V. OSS Architectures . . . . .	71
VI. Limitations and Challenges . . . . .	90
References . . . . .	91

### Semiconductor Quantum Devices

MARC CAHAY AND SUPRIYO BANDYOPADHYAY

I. Introduction . . . . .	94
II. Quantum Devices . . . . .	98
III. Resonant Tunneling Devices . . . . .	121
IV. Aharonov–Bohm Effect-Based Devices . . . . .	142
V. T-Structure Transistors . . . . .	178
VI. Electron Wave Directional Couplers . . . . .	193

VII. Spin Precession Devices . . . . .	199
VIII. Granular Electron Devices . . . . .	203
IX. Connecting Quantum Devices on a Chip: The Interconnecting Problems . . . . .	208
X. Quantum-Coupled Architectures and Quantum Chips . . . . .	217
XI. Epilogue: The Long-Term Prognosis . . . . .	243
References . . . . .	245

### **Fuzzy Relations and Applications**

BERNARD DE BAETS AND ETIENNE KERRE

I. Introduction to Fuzzy Set Theory . . . . .	255
II. Fuzzy Relational Calculus . . . . .	266
III. Special Types of Fuzzy Relations . . . . .	291
IV. Applications of Triangular Compositions . . . . .	297
V. Fuzzy Inference Mechanisms . . . . .	312
References . . . . .	323

### **Basis Algorithms in Mathematical Morphology**

RONALD JONES AND IMANTS D. SVALBE

I. Introduction . . . . .	326
II. Basis Algorithms . . . . .	334
III. Applying the General Basis Algorithm . . . . .	342
IV. Filtering Properties and the Basis Representation . . . . .	349
V. Translation-Invariant Set Mappings . . . . .	358
VI. Gray-Scale Function Mappings . . . . .	366
VII. Transforming the Basis Representation . . . . .	374
VIII. Conclusion . . . . .	383
Appendix . . . . .	385
References . . . . .	389

### **Mirror-Bank Energy Analyzers**

S. P. KARETSKAYA, L. G. GLICKMAN, L. G. BEIZINA,  
AND YU. V. GOLOSKOKOV

I. Introduction . . . . .	391
II. Equations for Charged Particle Trajectories in an Electrostatic Field Having a Symmetry Plane . . . . .	393

III. Peculiarities of Charged Particle Focusing and Energy Separation in a Mirror with a Two-Dimensional Electric Field . . . . .	399
IV. Energy Analyzers Based on Mirrors with Two-Plate Electrodes Separated by Direct Slits . . . . .	410
V. Peculiarities of Charged Particle Focusing and Separation in En- ergy in a Transaxial Mirror . . . . .	433
VI. Energy Analyzers Based on Transaxial Mirrors with Two-Plate Electrodes . . . . .	441
VII. Conclusion . . . . .	477
References . . . . .	478
INDEX . . . . .	481