## Contents

Preface	ix
Introduction	хi
An introduction to mirror manifolds B. R. Greene and M. R. Plesser	1
A pair of Calabi-Yau manifolds as an exactly soluble superconformal theory Philip Candelas, Xenia C. de la Ossa, Paul S. Green, and Linda Parkes	31
Topological mirrors and quantum rings CUMRUN VAFA	97
Mirror manifolds and topological field theory EDWARD WITTEN	121
Rational curves and classification of algebraic varieties YUJIRO KAWAMATA	161
Rational curves on Calabi-Yau threefolds SHELDON KATZ	169
Picard-Fuchs equations and mirror maps for hypersurfaces DAVID R. MORRISON	185
Kähler classes on Calabi-Yau threefolds—An informal survey P. M. H. WILSON	201
Automorphic functions and special Kähler geometry S. Ferrara, C. Kounnas, D. Lüst, and F. Zwirner	215
Picard-Fuchs equations and flat holomorphic connections from ${\cal N}=2$ supergravity	_
S. Ferrara and J. Louis	237
A new geometry from superstring theory P. S. ASPINWALL AND C. A. LÜTKEN	253
The geometry of Calabi-Yau orbifolds SHI-SHYR ROAN	279
Properties of superstring vacua from (topological) Landau-Ginzburg models Amit Giveon and Dirk-Jan Smit	287

viii CONTENTS

An $SL(2,\mathbb{C})$ action on certain Jacobian rings and the mirror map TRISTAN HÜBSCH AND SHING-TUNG YAU	311
A generalized construction of mirror manifolds PER BERGLUND AND TRISTAN HÜBSCH	327
New constructions of mirror manifolds: Probing moduli space far from Fermat points B. R. Greene, M. R. Plesser, and SS. Roan	347
Deformations of Calabi-Yau Kleinfolds ZIV RAN	391
Smoothing 3-folds with trivial canonical bundle and ordinary double points GANG TIAN	399
Modified Calabi-Yau manifolds with torsion Мактін Ročeк	421
Calabi-Yau threefolds and complex multiplication CIPRIAN BORCEA	431