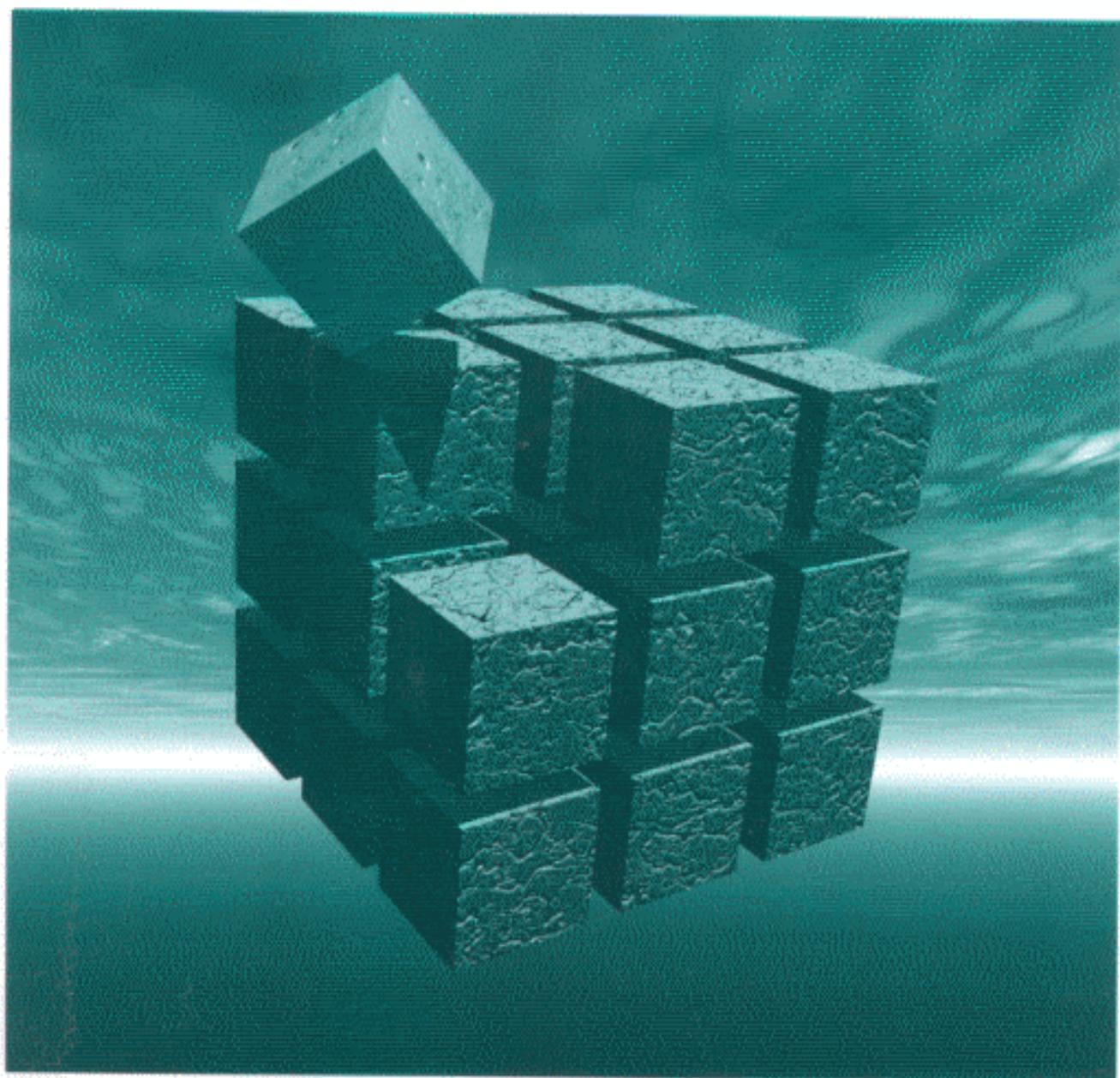


Solid Modeling with **Pro/ENGINEER**TM



SHERYL A. SORBY • BRETT H. HAMLIN

Contents .

Preface ix

Acknowledgments x

1 Engineering Design 1

- 1.1 The Design Procedure 1
- 1.2 Computers in Design 2
- 1.3 Concurrent Engineering 2
- 1.4 Flexibility in Design 3
- 1.5 Text Organization 4

2 User Interface and File Management in Pro/ENGINEER Software 7

- 2.1 Pro/ENGINEER's Working Environment 7
 - 2.1.1 The Pull Down Menus 8
 - 2.1.2 Shortcut Tool Bar 10
- 2.2 The Modes in Pro/ENGINEER 13
- 2.3 Setting Up a Working Environment in Part Mode 14
 - 2.3.1 Unit System 14
 - 2.3.2 Datum Planes 15
- 2.4 Preferences in Pro/ENGINEER 19
 - 2.4.1 System Environment 19
 - 2.4.2 Color Preferences 20
- 2.5 Pro/ENGINEER's Intent Manager 20
- 2.6 Obtaining On-Line Help in Pro/ENGINEER 20
- 2.7 Chapter Wrap-Up 21
- 2.8 Chapter Summary 21

3 Two-Dimensional Constraints 23

- 3.1 What Are Constraints? 23
- 3.2 Types of Constraints 24
 - 3.2.1 Geometric Constraints 24
 - 3.2.2 Dimensional Constraints 28
 - 3.2.3 Adding Dimensional Constraints in Pro/ENGINEER 29

3.3	Modifying Dimensional Constraints to Size Your Sketch	31
3.3.1	Modifying Dimensional Constraints in Pro/ENGINEER	32
3.3.2	Adding Dimensional Relationships in Pro/ENGINEER	32
3.4	Constraining 2-D Geometry Automatically as You Sketch	34
3.4.1	Automatically Constraining as You Sketch in Pro/ENGINEER	34
3.5	Strategy for Constraining Sketches	35
3.6	Troubleshooting	38
3.7	Chapter Summary	38

4 Creating 3-D Parts from 2-D Geometry 41

4.1	Sketching or Drawing 2-D Geometry	42
4.1.1	Sketching 2-D Geometry in Pro/ENGINEER	44
4.1.2	Automatic Constraints	44
4.1.3	Sketching 2-D Geometry	44
4.2	Fillets and Rounds	44
4.2.1	Fillets and Rounds in Pro/ENGINEER	45
4.2.2	Using the Pro/ENGINEER Mouse Sketch	46
4.2.3	Deleting Geometry from your Sketch	46
4.3	Trimming and Extending Entities	47
4.3.1	Trimming and Extending in Pro/ENGINEER	47
4.3.2	Extruding a 2-D Shape	49
4.4	Creating 3-D Solids by Extrusion in Pro/ENGINEER	50
4.5	Sketch Planes	54
4.5.1	Sketching on a Surface of an Object in Pro/ENGINEER	54
4.6	Revolving a 2-D Shape	54
4.6.1	Creating 3-D Solids by Revolution in Pro/ENGINEER	56
4.7	Modeling Strategy	59
4.8	Troubleshooting/FAQs	66
4.9	Chapter Summary	67

5 Displaying 3-D Objects 73

5.1	Observer Location	73
5.1.1	Setting the Observer Location in Pro/ENGINEER	75
5.2	Object Edge Appearance	76
5.2.1	Object Edge Appearance in Pro/ENGINEER	78
5.3	Object Surface Appearance	79
5.3.1	Surface Appearance in Pro/ENGINEER	80
5.4	Display of Nongeometric Object Entities	83
5.4.1	Display of Nongeometric Entities in Pro/ENGINEER	83
5.5	Dynamic Viewing	84
5.5.1	Dynamic Viewing in Pro/ENGINEER	84
5.6	Troubleshooting/FAQs	85
5.7	Chapter Summary	85

6 Construction Techniques 89

6.1	Feature-Based Modeling	89
6.1.1	Standardized Part Features	89
6.1.2	Locating and Constraining Features	91

6.1.3	Adding Standard Features in Pro/ENGINEER	92
6.1.4	Rounds and Chamfer Features in Pro/ENGINEER	93
6.1.5	Reference Geometry	96
6.1.6	Datum Plane Operations in Pro/ENGINEER	97
6.1.7	Adding Other Reference Geometry in Pro/ENGINEER	99
6.2	Construct Strategy	100
6.2.1	Filletting and Chamfering Strategy	105
6.3	Troubleshooting/FAQs	106
6.4	Chapter Summary	106

7 Advanced Modeling Techniques 111

7.1	Reflecting Objects	111
7.1.1	Reflecting Objects in Pro/ENGINEER	112
7.2	Copying Objects	113
7.3	Modifying and Deleting Individual Features in Pro/ENGINEER	113
7.4	Cross Sections and Paths	114
7.5	Creating Objects by Blending	116
7.5.1	Blending Solid Objects in Pro/ENGINEER	117
7.6	Creating Objects by Sweeping	119
7.6.1	Sweeping Solid Objects in Pro/ENGINEER	121
7.7	Blending and Sweeping Strategy	125
7.8	Troubleshooting/FAQs	131
7.9	Chapter Summary	131

8 Creating an Engineering Drawing 135

8.1	Creating 2-D Drawings from 3-D Models	135
8.1.1	Special Views	137
8.1.2	Creating Drawings from Part Geometry in Pro/ENGINEER	139
8.1.3	Adding Views to Drawings	142
8.1.4	Modifying Drawing Views	145
8.1.5	Adding/Changing Drawing Annotation	146
8.1.6	Adding a Title Block and Format	147
8.1.7	Managing Your Drawings	149
8.2	Two-Dimensional Drawing Strategy	149
8.3	Troubleshooting/FAQs	152
8.4	Chapter Summary	152
Index		157