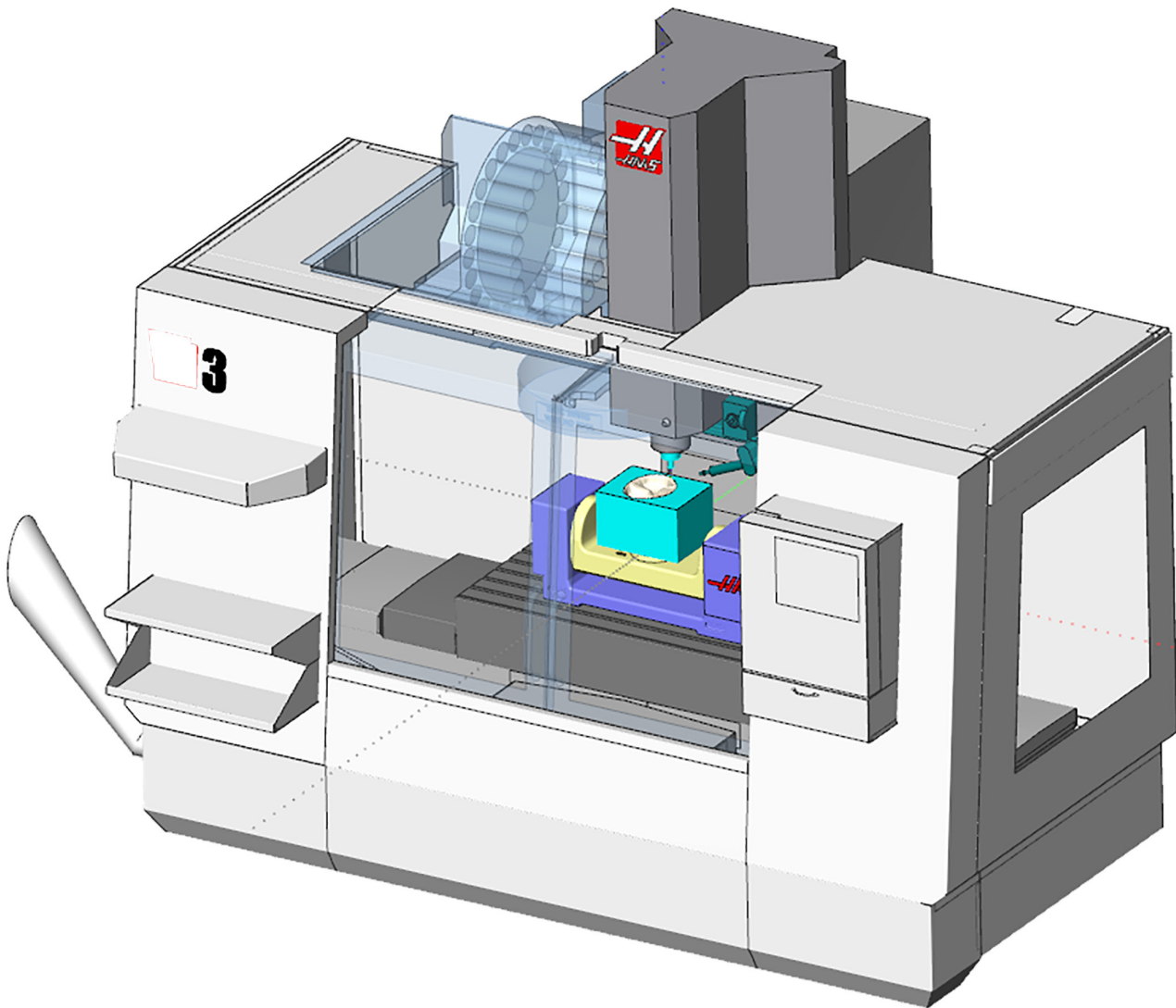


Virtual Machining Using **CAMWorks® 2018**

CAMWorks as a SOLIDWORKS® Module



Kuang-Hua Chang, Ph.D.

Visit the following websites to learn more about this book:



[amazon.com](https://www.amazon.com)

[Google books](https://books.google.com)

[BARNES & NOBLE](https://www.barnesandnoble.com)

Table of Contents

Preface	i
Acknowledgments	iii
About the Author	iv
About the Cover	v
Table of Contents	vi
Lesson 1: Introduction to CAMWorks	1
1.1 Overview of the Lesson	1
1.2 Virtual Machining	2
1.3 CAMWorks Machining Modules	4
1.4 User Interface	4
1.5 Opening Lesson 1 Model and Entering CAMWorks	7
1.6 Extracting Machinable Features	9
1.7 Technology Database	10
1.8 CAMWorks Machine Simulation	10
1.9 Tutorial Examples	12
Lesson 2: A Quick Run-Through	15
2.1 Overview of the Lesson	15
2.2 The Simple Plate Example	15
2.3 Using CAMWorks	16
2.4 The Post Process and G-Code	26
2.5 Reviewing Machining Time	29
2.6 Exercises	30
Lesson 3: Machining 2.5 Axis Features	33
3.1 Overview of the Lesson	33
3.2 The 2.5 Axis Features Example	34
3.3 Using CAMWorks	36
3.4 Creating a Face Milling Operation	40
3.5 Re-Ordering Machining Operations	45
3.6 Reviewing Machining Time	45
3.7 The Post Process and G-Code	46
3.8 Stepping Through the Toolpath	46
3.9 Exercises	47
Lesson 4: Machining a Freeform Surface	49
4.1 Overview of the Lesson	49
4.2 The Freeform Surface Example	50
4.3 Using CAMWorks	52
4.4 Selecting Avoid Feature to Correct the Toolpath	57
4.5 Modifying the Area Clearance Toolpath	57
4.6 Reviewing the Machined Part Quality	61
4.7 Adding a Local Milling Operation	62
4.8 Reviewing and Modifying the Pattern Project Operation	65
4.9 Exercises	68

Lesson 5: Multipart Machining.....	69
5.1 Overview of the Lesson	69
5.2 The Multipart Machining Example.....	69
5.3 Using CAMWorks	71
5.4 The Sequence of Part Machining.....	74
5.5 The G-code.....	74
5.6 Exercises	80
Lesson 6: Multiplane Machining.....	83
6.1 Overview of the Lesson	83
6.2 The Multiplane Machining Example	84
6.3 Using CAMWorks	87
6.4 The Sequence of Part Machining.....	93
6.5 Reviewing the G-code.....	94
6.6 Exercises	98
Lesson 7: Multiaxis Milling and Machine Simulation	101
7.1 Overview of the Lesson	101
7.2 The Multiaxis Machining Example.....	102
7.3 Using CAMWorks	104
7.4 Adding a Local Milling Operation.....	109
7.5 Adding a Multiaxis Surface Milling Operation	112
7.6 Tool Gouging.....	114
7.7 Machine Simulation.....	115
7.8 Revisiting the Freeform Surface Example	118
7.9 Exercises	119
Lesson 8: Turning a Stepped Bar	121
8.1 Overview of the Lesson	121
8.2 The Stepped Bar Example.....	122
8.3 Using CAMWorks	124
8.4 Reviewing the Turn G-code.....	132
8.5 Exercises	133
Lesson 9: Turning a Stub Shaft	135
9.1 Overview of the Lesson	135
9.2 The Stub shaft Example	136
9.3 Using CAMWorks	138
9.4 Cutting the Thread	144
9.5 Boring the Hole.....	151
9.6 Using a Turn-Mill	152
9.7 Exercises	155
Lesson 10: Die Machining Application.....	157
10.1 Overview of the Lesson	157
10.2 The Sheet Metal Part Design	157
10.3 Sheet Metal Forming Simulation.....	158
10.4 Tooling Design.....	160
10.5 Adding a Virtual CNC Mill to CAMWorks.....	160
10.6 Customizing Technology Database	161
10.7 Virtual Machining Simulation using CAMWorks	165
10.8 Machine Simulation.....	166
10.9 Machining the Die Using HAAS Mill	169

10.10 Process Implementation and Validation.....	169
Appendix A: Machinable Features	
A.1 Overview.....	173
A.2 Machinable Features for Milling Operations.....	173
A.3 Machinable Features for Turning Operations.....	177
Appendix B: Machining Operations.....	180
B.1 Overview.....	180
B.2 Milling Operations.....	180
B.3 Turning Operations.....	181