

Contents

Preface	vii
Notes to Readers	xiii
1 Getting Started	1
1.1 Starting RExcel with the RExcel Icon	1
1.2 Starting RExcel from a Running Excel Window	3
1.2.1 Starting RExcel from a Running Excel 2007 Window	3
1.2.2 Starting RExcel from a Running Excel 2003 Window	5
1.3 Starting R Commander Without Excel	7
1.4 Window Arrangement	10
1.5 Graphics History	10
1.6 Quitting RExcel	11
2 Using RExcel and R Commander	13
2.1 Appearance	13
2.2 The Dataset and Model Menus	22
2.3 R Console	32
2.4 R Commander Window	34
2.5 R Help Files	35
2.6 Messages from R, Rcmdr, or Excel	35
3 Getting Data into R	37
3.1 Example Datasets	37
3.2 Named Columns of Data	40
3.3 Unnamed Columns of Data	46
3.4 Numeric Columns and Factor Columns	49
3.5 Multiple Numeric Columns, One per Factor Level	52
3.6 Transferring Data from R to Excel	57
3.7 Other Input Formats, Including ASCII Text Files	60

4	Normal and t Distributions	61
4.1	Accessing R Functions with the Rcmdr Menus	61
4.2	Accessing R Functions from Within Excel Cells	66
4.3	Graphical Displays of the Standard Normal Distribution	69
4.4	Significance Level, Rejection Region, and Type I Error	71
4.5	Type II Error and Power	74
4.6	Displaying Graphs	79
5	Normal and t Workbook	81
5.1	Standard Normal and t Distributions	81
5.2	Relation Between α and z	86
5.3	Normal Tests, Type II Error, and Power	87
5.4	Significance, Rejection Region, and Power—Continued	91
5.5	How Does the Normal and t Workbook Work?	95
5.5.1	Input Fields	95
5.5.2	Display Parameters	96
5.5.3	Numerical Output	96
5.6	Confidence Intervals	97
5.6.1	Algebra	97
5.6.2	Workbook	98
5.7	Scaling to Keep Constant Area	99
5.8	Normal Approximation to the Binomial	102
6	t-Tests	105
6.1	Data—Canned Vegetables	106
6.1.1	Plot the Data	109
6.1.1.1	Histogram	109
6.1.1.2	Dotplot	111
6.1.1.3	Boxplot	113
6.1.2	Calculate the t -Test	115
6.1.3	Plot the t -Test	117
6.2	Data—Heights	121
6.2.1	Plots	124
6.2.1.1	Scatterplots	124
6.2.1.2	Dotplots	126
6.2.1.3	Boxplots	127
6.2.1.4	Bar Graph for Frequencies	128
6.2.2	Summary Statistics	129
6.2.3	Subsetting the Data for Males	130
6.2.4	One-Sample t -Test for Males	136
6.2.5	Two-Sample t -Test Comparing Males and Females	139
6.3	Matched Pairs t -Test	144
6.4	Confidence Interval Plot	152
6.4.1	Confidence Intervals with the normal and t Worksheet	152

- 6.4.2 Confidence Intervals with the Plot [normal|t] hypotheses or Confidence Intervals...
Menus 154
- 6.5 Hypothesis Plot and Confidence Interval Plot from Summary Information 155
 - 6.5.1 Hypothesis Plots with the Plot hypotheses and Confidence Intervals Menu and Workbook 155
 - 6.5.2 Hypothesis Plot..... 156
 - 6.5.3 Confidence Interval Plot 158
- 6.6 Alternate Styles for the Calculation of Confidence Intervals 160
 - 6.6.1 Recommended Style 160
 - 6.6.2 Not Recommended Style 163
- 7 One-Way ANOVA 165
 - 7.1 Data..... 165
 - 7.2 Plots 168
 - 7.2.1 Dotplot..... 168
 - 7.2.2 Boxplot 170
 - 7.3 ANOVA Specification..... 172
 - 7.4 ANOVA Table and *F*-Test 174
 - 7.5 Table of Means 178
 - 7.6 Multiple Comparisons 179
 - 7.7 Mean–Mean Multiple Comparisons Plot 182
 - 7.8 Linear Contrasts 187
- 8 Simple Linear Regression 193
 - 8.1 Least-Squares Regression with RExcel/Rcmdr 194
 - 8.2 Scatterplot 197
 - 8.3 Linear Regression Analysis 200
 - 8.4 Residuals Analysis 204
 - 8.5 Confidence Bands and Prediction Bands 209
- 9 What Is Least Squares? 213
 - 9.1 Minimizing the Sum of Squares 213
 - 9.2 Hat Diagonals and Leverage 223
 - 9.3 Residuals and Leverage 229
 - 9.4 Reset the Workbook to the Values in the Text 233
- 10 Multiple Regression—Two X-Variables 235
 - 10.1 The Multiple Regression Model 235
 - 10.2 Example 236
 - 10.3 Specify and Fit Several Linear Models 243
 - 10.4 Graphical Comparison of Models 247
 - 10.4.1 Plot Residuals ~ Fitted..... 250
 - 10.4.2 Rescale Plots for Ease of Comparison 252
 - 10.4.3 Lattice Plots with Coordinated Scales 254

10.4.4	Stacking with the Right-Click Menu	255
10.4.5	Menu and Dialog Box for Lattice Plot	261
10.5	ANOVA Table	263
10.6	Confidence Intervals and Prediction Intervals	265
11	Polynomial Regression	269
11.1	Regression on a Quadratic Function of X	269
11.2	Linear Fit	274
11.3	Quadratic Fit	278
11.4	Plot of Squared Residuals	283
12	Multiple Regression—Three or More X-Variables	285
12.1	Shoe Sizes of Austrian Students	286
12.2	Plots	293
12.3	Regression Analysis	300
12.4	Basic Diagnostic Plots	304
12.5	Confidence Intervals	305
13	Contingency Tables and the Chi-Square Test	309
13.1	Gender and Smoking	310
13.1.1	Two-Way Table Chi-Square Test	310
13.1.2	Two-Sample Proportions Test	312
13.2	German and Math Grades	318
A	Installation of RExcel	323
A.1	Basic Installation Procedures	323
A.2	Supported Excel Versions	324
A.3	Download and Installation of R and RExcel for MS Windows	324
A.3.1	Preparation	325
A.3.2	An Ancient Previous Version of RExcel Must Be Uninstalled	325
A.3.3	Installation	326
A.4	Installing RExcel for MS Windows When R Is Already Installed ...	327
A.5	Upgrade an Existing R Installation	328
A.6	R and Rcmdr Without Excel—Windows, Macintosh, Linux	329
A.6.1	Install the Rcmdr, HH, and RcmdrPlugin.HH packages	329
A.6.2	Use the R Commander Directly	329
A.6.3	Data Input	329
A.7	R and Open Office	330
A.8	License for statconnDCOM	330
A.9	Digital Certificate	330
B	Nuisances—Installation, Startup, or Execution	333
B.1	Installation	333
B.2	Startup	334
B.3	Execution	334