

Contents

Preface	v
1 Introduction	1
1.1 The Programs	1
1.2 System Requirements	2
1.2.1 Installation	3
1.2.2 Running ITSM	7
1.2.3 Printing Graphs	7
1.3 Creating Data Files	8
2 PEST	9
2.1 Getting Started	9
2.1.1 Running PEST	9
2.1.2 PEST Tutorial	10
2.2 Preparing Your Data for Modelling	10
2.2.1 Entering Data	11
2.2.2 Filing Data	12
2.2.3 Plotting Data	12
2.2.4 Transforming Data	13
2.3 Finding a Model for Your Data	19
2.3.1 The ACF and PACF	19
2.3.2 Entering a Model	21
2.3.3 Preliminary Parameter Estimation	22
2.3.4 The AICC Statistic	24
2.3.5 Changing Your Model	26
2.3.6 Parameter Estimation; the Gaussian Likelihood	27
2.3.7 Optimization Results	31
2.4 Testing Your Model	34
2.4.1 Plotting the Residuals	36
2.4.2 ACF/PACF of the Residuals	36
2.4.3 Testing for Randomness of the Residuals	37
2.5 Prediction	41
2.5.1 Forecast Criteria	41

2.5.2	Forecast Results	41
2.5.3	Inverting Transformations	42
2.6	Model Properties	44
2.6.1	ARMA Models	45
2.6.2	Model ACF, PACF	46
2.6.3	Model Representations	47
2.6.4	Generating Realizations of a Random Series	49
2.6.5	Model Spectral Density	50
2.7	Nonparametric Spectral Estimation	53
2.7.1	Plotting the Periodogram	53
2.7.2	Plotting the Cumulative Periodogram	55
2.7.3	Fisher's Test	56
2.7.4	Smoothing to Estimate the Spectral Density	57
3	SMOOTH	60
3.1	Introduction	60
3.2	Moving Average Smoothing	61
3.3	Exponential Smoothing	62
3.4	Removing High Frequency Components	64
4	SPEC	66
4.1	Introduction	66
4.2	Bivariate Spectral Analysis	66
4.2.1	Estimating the Spectral Density of Each Series	67
4.2.2	Estimating the Absolute Coherency Spectrum	69
4.2.3	Estimating the Phase Spectrum	70
5	TRANS	72
5.1	Introduction	72
5.2	Computing Cross Correlations	72
5.3	An Overview of Transfer Function Modelling	74
5.4	Fitting a Preliminary Transfer Function Model	76
5.5	Calculating Residuals from a Transfer Function Model	78
5.6	LS Estimation and Prediction with Transfer Function Models	80
6	ARVEC	86
6.1	Introduction	86
6.1.1	Multivariate Autoregression	87
6.2	Model Selection with the AICC Criterion	89
6.3	Forecasting with the Fitted Model	89
7	BURG	91
7.1	Introduction	91

8 ARAR	95
8.1 Introduction	95
8.1.1 Memory Shortening	95
8.1.2 Fitting a Subset Autoregression	97
8.2 Running the Program	98
9 LONGMEM	101
9.1 Introduction	101
9.2 Parameter Estimation	102
9.3 Prediction	104
9.4 Simulation	105
9.5 Plotting the Model and Sample ACVF	106
Appendix A: The Screen Editor WORD6	108
A.1 Basic Editing	108
A.2 Alternate Keys	108
A.3 Printing a File	109
A.4 Merging Two or More Files	109
A.5 Margins and Left and Centre Justification	109
A.6 Tab Settings	110
A.7 Block Commands	110
A.8 Searching	111
A.9 Special Characters	111
A.10 Function Keys	112
A.11 Editing Information	112
Appendix B: Data Sets	113
Index	116