

Methods of Time-Series Analysis 1: 1990

0.5 cu Semester 6, Lecturer : D.S.G. Pollock

This course is concerned with the methods of time-series modelling which are applicable in econometrics and throughout a wide range of disciplines in the physical and social sciences. The requisite mathematics is reviewed, and the Fourier method of decomposing time series into cyclical components is used as a basis for developing the frequency-domain method of Spectral Analysis. The autoregressive moving-average models are introduced and analysed in terms of both the frequency domain and the time domain. Transfer-function models are also considered together with multiple time series and cross spectra. The lectures are accompanied by a series of printed chapters and by a series of computer programs designed specifically to illustrate the topics. The topics are as follows:

The Algebra of the Lag Operator

Algebraic Polynomials

Fourier Transforms and z-Transforms

Difference and Differential Equations

The Solution of Linear Dynamic Equations

The State-Space Approach to Dynamic Modelling:

Fourier Analysis

Periodic and Aperiodic Functions

The Fast Fourier Transform

Stationary Stochastic Processes and Linear Stochastic Models

Autoregressive and Moving-Average Models

Transfer-Function Models

Multivariate Dynamic Models

Spectral Analysis

The Power Spectrum of a Stationary Process

Linear Filters

Forecasting with Linear Stochastic Models

The Wiener-Kolmogorov Approach to Forecasting

Forecasting via the Kalman Filter

Nonstationary Models

Reduction to Stationarity

Integration and Co-integration