NAG Library Chapter Contents

g13 – Time Series Analysis

g13 Chapter Introduction

Function Name	Mark of Introduction	Purpose
g13aac	7	nag_tsa_diff Univariate time series, seasonal and non-seasonal differencing
g13abc	2	nag_tsa_auto_corr Sample autocorrelation function
g13acc	2	nag_tsa_auto_corr_part Partial autocorrelation function
g13amc	9	nag_tsa_exp_smooth Univariate time series, exponential smoothing
g13asc	6	nag_tsa_resid_corr Univariate time series, diagnostic checking of residuals, following nag_tsa_multi_inp_model_estim (g13bec)
g13auc	7	nag_tsa_mean_range Computes quantities needed for range-mean or standard deviation-mean plot
g13bac	7	nag_tsa_arma_filter Multivariate time series, filtering (pre-whitening) by an ARIMA model
g13bbc	7	nag_tsa_transf_filter Multivariate time series, filtering by a transfer function model
g13bcc	7	nag_tsa_cross_corr Multivariate time series, cross-correlations
g13bdc	7	nag_tsa_transf_prelim_fit Multivariate time series, preliminary estimation of transfer function model
g13bec	2	nag_tsa_multi_inp_model_estim Estimation for time series models
g13bgc	8	nag_tsa_multi_inp_update Multivariate time series, update state set for forecasting from multi-input model
g13bjc	2	nag_tsa_multi_inp_model_forecast Forecasting function
g13bxc	2	nag_tsa_options_init Initialization function for option setting
g13byc	2	nag_tsa_transf_orders Allocates memory to transfer function model orders
g13bzc	2	nag_tsa_trans_free Freeing function for the structure holding the transfer function model orders
g13cac	7	nag_tsa_spectrum_univar_cov Univariate time series, smoothed sample spectrum using rectangular, Bartlett, Tukey or Parzen lag window
g13cbc	4	nag_tsa_spectrum_univar Univariate time series, smoothed sample spectrum using spectral smoothing by the trapezium frequency (Daniell) window
g13ccc	7	nag_tsa_spectrum_bivar_cov Multivariate time series, smoothed sample cross spectrum using rectangular, Bartlett, Tukey or Parzen lag window
g13cdc	4	nag_tsa_spectrum_bivar Multivariate time series, smoothed sample cross spectrum using spectral smoothing by the trapezium frequency (Daniell) window
g13cec	4	nag_tsa_cross_spectrum_bivar Multivariate time series, cross amplitude spectrum, squared coherency, bounds, univariate and bivariate (cross) spectra

g13cfc	4	nag_tsa_gain_phase_bivar Multivariate time series, gain, phase, bounds, univariate and bivariate (cross) spectra
g13cgc	4	nag_tsa_noise_spectrum_bivar Multivariate time series, noise spectrum, bounds, impulse response function and its standard error
g13dbc	7	nag_tsa_multi_auto_corr_part Multivariate time series, multiple squared partial autocorrelations
g13ddc	8	nag_tsa_varma_estimate Multivariate time series, estimation of VARMA model
g13djc	8	nag_tsa_varma_forecast Multivariate time series, forecasts and their standard errors
g13dkc	8	nag_tsa_varma_update Multivariate time series, updates forecasts and their standard errors
g13dlc	7	nag_tsa_multi_diff Multivariate time series, differences and/or transforms
g13dmc	7	nag_tsa_multi_cross_corr Multivariate time series, sample cross-correlation or cross-covariance matrices
g13dnc	7	nag_tsa_multi_part_lag_corr Multivariate time series, sample partial lag correlation matrices, χ^2 statistics and significance levels
g13dpc	7	nag_tsa_multi_part_regsn Multivariate time series, partial autoregression matrices
g13dsc	8	nag_tsa_varma_diagnostic Multivariate time series, diagnostic checking of residuals, following nag_tsa_varma_estimate (g13ddc)
g13dxc	7	nag_tsa_arma_roots Calculates the zeros of a vector autoregressive (or moving average) operator
g13eac	3	nag_kalman_sqrt_filt_cov_var One iteration step of the time-varying Kalman filter recursion using the square root covariance implementation
g13ebc	3	nag_kalman_sqrt_filt_cov_invar One iteration step of the time-invariant Kalman filter recursion using the square root covariance implementation with (A, C) in lower observer Hessenberg form
g13ecc	3	nag_kalman_sqrt_filt_info_var One iteration step of the time-varying Kalman filter recursion using the square root information implementation
g13edc	3	nag_kalman_sqrt_filt_info_invar One iteration step of the time-invariant Kalman filter recursion using the square root information implementation with $(A^{-1}, A^{-1}B)$ in upper controller Hessenberg form
g13ewc	3	nag_trans_hessenberg_observer Unitary state-space transformation to reduce (A, C) to lower or upper observer Hessenberg form
g13exc	3	nag_trans_hessenberg_controller Unitary state-space transformation to reduce (B, A) to lower or upper controller Hessenberg form
g13fac	6	nag_estimate_agarchI Univariate time series, parameter estimation for either a symmetric GARCH process or a GARCH process with asymmetry of the form $(\epsilon_{t-1} + \gamma)^2$
g13fbc	6	nag_forecast_agarchI Univariate time series, forecast function for either a symmetric GARCH process or a GARCH process with asymmetry of the form $(\epsilon_{t-1} + \gamma)^2$
g13fcc	6	nag_estimate_agarchII Univariate time series, parameter estimation for a GARCH process with asymmetry of the form $(\lvert\epsilon_{t-1}\rvert + \gamma\epsilon_{t-1})^2$

g13fdc	6	nag_forecast_agarchII Univariate time series, forecast function for a GARCH process with asymmetry of the form $(\lvert\epsilon_{t-1}\rvert + \gamma\epsilon_{t-1})^2$
g13fec	6	nag_estimate_garchGJR Univariate time series, parameter estimation for an asymmetric Glosten, Jagannathan and Runkle (GJR) GARCH process
g13ffc	6	nag_forecast_garchGJR Univariate time series, forecast function for an asymmetric Glosten, Jagannathan and Runkle (GJR) GARCH process
g13mec	24	nag_tsa_inhom_iema Computes the iterated exponential moving average for a univariate inhomogeneous time series
g13mfc	24	nag_tsa_inhom_iema_all Computes the iterated exponential moving average for a univariate inhomogeneous time series, intermediate results are also returned
g13mgc	24	nag_tsa_inhom_ma Computes the exponential moving average for a univariate inhomogeneous time series
g13xzc	2	nag_tsa_free Freeing function for use with g13 option setting