ACRONYMS IN TIME SERIES ANALYSIS (ATSA)

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In their well-known book, Box and Jenkins promote a class of models which they called integrated autoregressive moving averages and denoted them ARIMA, rather than the more logical IARMA. Since then many writers have acted as though they believe that the success of the Box–Jenkins models is largely due to the use of the acronyms. It now seems to be obligatory to provide an acronym, or catchy abbreviation, whenever a new time series model, technique or computer program is introduced. This tendency seems to be particularly true in papers on models or methods in the time domain, but to be virtually non-existent in frequency domain work (see, however, FFT). As this proliferation continues it seems likely that soon competing initials for the same model, or the same initials for different models, will arise. To clarify the position the following is a list of abbreviations for time series models and techniques. All have been seen in print and an attempt has been made to include all abbreviations that are potentially useful. Names of computer programs have not been included as these are sometimes of limited availability, or are sold commercially. The list is roughly alphabetical in each of two parts, the first on models, and the second on techniques. In a few cases, for specific models or techniques which are not well known, a reference has been provided, but for some abbreviations which are rather obvious (such as MAR or NLAR) no attempt has been made to discover where it originated, as this would be a very difficult task. It can also be argued that unnecessary proliferation of these abbreviations should not be encouraged and so originators should not always be identified.

The basic model, from which many others are derived, is

$$a_p(B)(1-B)^d x_t = b_q(B)\varepsilon_t \tag{*}$$

where ε_t is white noise $a_p(B)$ is a polynomial of order p in the backward operator B, $b_q(B)$ is a polynomial of order q and both are such that $a(1)$ and $b(1)$ are not zero. This model is designated ARIMA (p, d, q).

Time Series Models

AR	Autoregressive
ARCH	Autoregressive conditional heteroscedasticity. Variance of residual depends on previous value of residual. See Engle (1979).

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ARIMA	Integrated autoregressive moving average, $d > 0$ in (*). d need not be an integer. See FGN.
ARMA	ARIMA (p, d, q) with $d = 0$.
ARARMA	Apply non-stationary AR to remove long-memory component and then model residuals as ARMA. See Parzen (1981b).
ARMAV	Autoregressive moving average vector. See MARMA. Pandit and Wu (1977).
ARMAT	Open-loop transfer function $$x_t = \frac{a(B)}{b(B)} y_t + \frac{c(B)}{d(B)} \varepsilon_t$$ order of $a(B) = a$, etc., then have ARMAT $((a, b), (c, d))$. Special case of ARMAX. See Poskitt and Tremayne (1981).
ARMAX	ARMA model (*) with addition of a distributed lag exogenous variable so that $a(B)x_t = b(B)\varepsilon_t + c(B)y_t$. Hannan (1979).
ARTFACT	Autoregressive transfer function approximator converging to the truth (finite order AR regarded as approximator to infinite order AR). See Parzen (1974).
ARUMA	Autoregressive unit circle moving average. Operator $a(B)$ in (*) contains roots on the unit circle other than at $B = 1$. See Anderson (1980).
BARMA	Bilinear autoregressive moving average. Inclusion of terms multiplying lagged x's and ε's in (*). For example $x_t = \eta x_{t-1} + \varepsilon_t + b\varepsilon_{t-1} + f\varepsilon_{t-1}x_{t-2}$. Granger and Andersen (1978).
BL	Same as BARMA but with no moving average component. Subba Rao (1981), Gabr and Rao (1981).
DARMA	Process x_t which has covariance properties of ARMA (p, q) but x_t has discrete marginal distribution. Jacobs and Lewis (1978).
DAR	DARMA (p, q) with $q = 0$.
DAR	Dyadic autoregressive process, Morettin (1981).
DMA	DARMA (p, q) with $p = 0$.
DMA	Dyadic moving average, Morettin (1981).
DLM	Dynamic linear model. Model expressible in Kalman state-space format. Harrison and Stevens (1976).
DYMIMIC	Dynamic form of MIMIC
EARMA	Process x_t with autocovariances of an ARMA (p, q) model, but with exponential marginal distribution. Thus $x_t \geqslant 0$. Lawrence and Lewis (1980).
EAR	EARMA (p, q) with $q = 0$.
EMA	EARMA (p, q) with $p = 0$.
EWMA	Exponentially weighted moving average.
EXPAR	AR model with coefficients depending on x_{t-1} in a specific exponential fashion. Haggan and Ozaki (1981).
FGN	Fractional Gaussian noise. Essentially ARIMA (p, d, q) with fractional d and Gaussion ε_t. See Hipel and McLeod (1978) and Granger and Joyeux (1980).

IMA	ARIMA (o, d, q). However ARI is not used for ARIMA (p, d, o).
MARMA	Multivariate autoregressive moving average. Identical to ARMAV but MARMA is more widely used.
MAR	Multivariate autoregressive.
MIMIC	Multiple-indicator multiple cause. Goldberger (1972).
MIMO	Multiple input multiple output.
NLAR	Non-linear autoregressive.
NLTAR	Non-linear threshold autoregressive. Ozaki (1981).
NMS	Non-linear Markovian system.
RARMA	ARMA with random orders and coefficients. Discussion of Tong and Lim (1980).
RKHS	Reproducing kernal Hilbert space, alternative to spectral and eigen value representations. Parzen (1961).
SARMA	ARMA models with seasonal components so that in (*) $a_p(B)$ is replaced by $a(B)a'_p(B^s)$ where s is the length of the seasonal.
SBL	Subset bilinear. Bilinear models using only a subset of all possible terms up to a prescribed maximum lag. See Gabr and Rao (1981).
SDM	State dependent model. Class of models that can be expressed in a non-linear state-space form. See Priestley (1980).
SETAR	Self-exciting threshold AR. See TAR, when parameter values depend on lagged values of series being explained.
SETA ϕ	SETAR model on data after application of instantaneous transform to data.
SMA	Seasonal moving average.
STARMA	Space-time ARMA. Pfeifer and Deutsch (1980).
TAR	Threshold autoregressive model. AR model with step function time-varying parameters, the values taken by the parameters depending on the achieved level of x_{t-1} or other series. See Tong and Lim (1980).
TARSO	Open-loop TAR. TAR system with observable input.
TARSC	Closed-loop TAR. Bivariate TARSO
TFARMA	Transfer function ARMA $Y_t = [a_r(B)/b_s(B)]X_t + [\varepsilon_p(B)/d_q(B)]\varepsilon_t$ where $a_s(B)$ is a polynomial of order s, etc. This model is the TFARMA $[(r, s), (p, q)]$. P. Newhold, "Model Checking in Time Series Analysis", to appear in conference proceedings (1982).
VBL	Same as BL except that the model is put in a vector form.
WN	White Noise.

Time Series Functions and Techniques

ACF	Autocorrelation function. Listing of *corr* (x_t, x_{t-k}) against k.
AEP	Adaptive estimation procedure. Estimation of particular ARMAX model with specific form of time-varying parameters. See Carbone and Login (1977).

AIC	Akaike information criterion, used for determing number of parameters in a model. See Akaike (1981).
ANOPOW	Analysis of power, ANOVA considerations. Brillinger (1973, 1980).
BAYSEA	Bayesian Seasonal adjustment.
BIC	Bayesian information criterion. Alternative to AIC. Akaike (1981).
CAT	Criterion for autoregressive transfer function. Alternative to AIC, BIC. See Parzen (1977).
COVA	Covariance analysis. Analysis of a series using just covariances.
DFT	Discrete Fourier transform.
ES	Evolutionary Spectra. Time dependent spectra for non-stationary processes. See Priestley (1981).
FFT	Fast Fourier transform. Computationally efficient method of demodulation and spectral estimation.
FPE	Final prediction error criterion. Forerunner to AIC, see Akaike (1969).
GHA	Generalized harmonic analysis.
IACF	Inverse autocorrelation function. Fourier transform of the inverse of the spectrum. See Cleveland (1972).
LPA	Least polytone analysis. Fitting curves with limited number of turning points. See Raveh (1980).
MANOPOW	Multivariate analysis of power, Brillinger (1980).
MEM	Maximum entropy method of autoregressive spectral estimation. See Childers (1978).
PACF	Partial autocorrelation function. Listing of *corr* $(x_t x_{t-k} \mid x_{t-j}, j = 1, \ldots, k-1)$ against k.
PVH	Prediction variance horizon function of a series, provides estimates of the memory type. See Parzen (1981a).
SDE	Stochastic differential (or difference) equation.
TSAR	Time series analysis of residuals, where the residuals are from a set of regression equations. See Ashley and Granger (1979).

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