Engel, E. M. R. A.

A unified approach to the study of sums, products, time-aggregation and other functions of ARMA processes. (English) Zbl 0541.62072

J. Time Ser. Anal. 5, 159-171 (1984).

Let $\{X_t\}$ be a stationary purely non-deterministic process with vanishing mean and with a covariance function r(k). Let B be the backshift operator. The author proves that $\{X_t\}$ is ARMA(p,q) iff there exist numbers $a_1, ..., a_p$ such that $a(z) = 1 - a_1 z - ... - a_p z^p \neq 0$ or $|z| \leq 1$, $a(B)r(k) = 0$ for $k > q$, and a(B)r(k)$\neq$ 0 for $k = q$.

Using this theorem some conditions are derived, under which sums, products and time-aggregation of ARMA processes follow ARMA processes. The author also considers functions of a Gaussian ARMA process. It is shown that the known results in this field published by other authors can be derived from the main theorem as special cases.

Reviewer: J.Anděl

MSC:

62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH)

Keywords:

autoregressive-moving average model; Box and Jenkins transfer function model; autocovariance function; functions of ARMA processes; transformed variables; sums; products; time-aggregation

Full Text: DOI

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