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Asymptotic filtering theory for multivariate ARCH models. (English) Zbl 0845.62080
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Summary: ARCH models are widely used to estimate conditional variances and covariances in financial time series models. How successfully can ARCH models carry out this estimation when they are misspecified? How can ARCH models be made robust to misspecification? *D. B. Nelson* and *D. P. Foster* [*Econometrica* 62, No. 1, 1-41 (1994; [Zbl 0804.62085](#))] employed continuous record asymptotics to answer these questions in the univariate case. This paper considers the general multivariate case. Our results allow us, for example, to construct an asymptotically optimal ARCH model for estimating the conditional variance or conditional beta of a stock return given lagged returns on the stock, volume, market returns, implicit volatility from options contracts, and other relevant data. We also allow for time-varying shapes of conditional densities (e.g., ‘heteroskewticity’ and ‘heterokurticity’). Examples are provided.

MSC:

[62P20](#) Applications of statistics to economics
[62M20](#) Inference from stochastic processes and prediction

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Keywords:

[heteroskewticity](#); [heterokurticity](#); [nonlinear filtering](#); [stochastic volatility](#); [diffusions](#); [GARCH models](#); [ARCH models](#); [misspecification](#); [general multivariate case](#); [asymptotically optimal ARCH model](#); [conditional variance](#); [conditional beta](#); [stock returns](#); [time-varying shapes of conditional densities](#)

Software:

[GAUSS](#); [Mathematica](#)

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