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Fuzzy Sets Approach in Mathematical Finance

In the time series literature, usually point estimates of the parameters are used to obtain the minimum mean square error forecasts. For example, the forecast of the $(n+1)^{th}$ observation based on y_1, \dots, y_n from $y_{n+1} - \hat{\mu} = \hat{\phi}(y_n - \hat{\mu})$ does not take into account the parameter variability. Fuzzy forecasts are shown to be better than the MMSE forecasts. Accurate estimates of volatility parameters are needed in option pricing. Generalized Autoregressive Conditional Heteroscedastic (GARCH) models and Random Coefficient Autoregressive (RCA) models have been used for volatility modelling. Option pricing using fuzzy estimates are discussed. An improved option pricing formula for Black-Scholes model with fuzzy volatility is also discussed in some detail.