Exploratory analysis and modeling of stock return data

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In this talk, we introduce a new methodology to model (the volatility of) stock returns. To capture stylized features such as higher-order autocorrelation in squared returns, heavy-tailedness, volatility clustering and leverage effect, it has become increasingly popular to use parametric ARCH/GARCH models and their variants to model volatility series. Based on a careful examination of the behavior of several stock return series, we propose robust nonparametric modeling for return series. Expressing volatility as some power (determined by a symmetry argument) of absolute residuals, we also propose semiparametric modeling for volatility series. Further, we explore and incorporate into our model the relationship between return, volatility and trading volume. We contrast and compare our work to the GARCH approach and some existing nonparametric and semiparametric models. We also evaluate the predictive performance of our method and of several GARCH model fits. The new approach is always competitive, often slightly better, and significantly better in certain situations to be detailed in the talk.