Homework
Master in Big Data

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0.1 Multivariate GARCH models

Problem 1 *The aim of this part of the section is to fit a multivariate GARCH-type model to financial time series returns.*

1. *For this part, please use three financial time series of returns. Range January 3, 1990 till March 15, 2019.*

2. *Plot the three return series against time and comment on their evolution. Is there any evidence of clustered volatility? In which periods do you think the returns were more volatile?*

3. *Estimate a Normal DCC-GARCH model for the daily returns. Use the whole sample data. Obtain the estimated parameters, as well as the conditional covariance matrices.*

4. *Comment on the covariance matrix of the last return observations (say T). According to the estimation results, which return series is more volatile at T? Is there any sign of negative cross-correlation among the three series?*

5. *Finally, re-estimate the Normal DCC-GARCH model but for the first 2000 observations of the daily returns. Find again the covariance matrix of the last observation. Comment on the differences between the covariance matrix found before with this new one.*