

This master thesis deals with extension of the univariate GARCH model to multivariate models. We present individual models and deal with methods of their estimation. Then we describe some statistical tests for diagnosing the models. We have programmed in the statistical software R one of them – the Ling-Li test. Afterwards we apply selected models to real data of stock market index S&P 500, stock market index Russell 2000 and stocks of crude oil. For the GO-GARCH model, we compare all available estimation methods and show their differences. Then we compare the results of all models with each other and also with univariate models in terms of estimates of conditional variances, estimates of conditional correlations and also in terms of computational complexity.