

This diploma thesis deals with modelling financial time series and especially the changing volatility of financial returns, which is characteristic for them. The theoretical part of the thesis describes several processes with non-constant conditional variance, which form an alternative to the classical ARMA approach to modelling time series. The focus is mainly on two types of processes - lognormal autoregressive process for conditional variance as an example of process where the conditional variance is independent of past returns, and on ARCH processes which to the contrary are based on dependence of the conditional variance on past returns. The properties of described models are verified and demonstrated in a simulation study carried out in Mathematica. Final part of the thesis is dedicated to application of the models to real data and modelling volatility of time series of returns of shares and currency rates. The parameters of the models are estimated and forecasts calculated in Mathematica with partial use of programme XploRe.