Exercise 6

1. *Portfolios with short positions*. In the classical portfolio management models it is usually assumed that the short positions have the same properties as the long positions and differ from the long positions only by sign.

In reality this is not the case and in order to take the short position an investor must place a certain amount of funds C in the specific collateral bank account which bears a risk free rate. After this an investor can take a short position which value can not exceed the amount of the placed funds C multiplied by some coefficient (larger than 1). If investor liquidates the short position the collateral is freed and returned to the investor.

a. Formulate the static portfolio management model which takes into account this phenomenon. The amount of collateral will be part of the portfolio. Assume that there exists the minimal amount of collateral which is accepted. Assume that returns of the instruments are described with the help of L scenarios.
b. Formulate this model in the case of constant and proportional transaction costs

2 Points

2. Historic VaR of portfolios

Select two arbitrary assets: A_1 and A_2 from the data set of index assets. Let P_1 be the portfolio consisting 100% of asset A_1 and P_2 be the portfolio consisting 100% of asset A_2

Consider portfolios $P_1+(1-)P_2$ and draw the dependence of 95% VaR of this portfolio on .

3 points