INDR 460
Homework 4

An investor has $6M to invest in two alternative assets. Asset-1 is a risky investment whose return rate has a normal distribution with mean 12% and standard deviation of 10%. On the other hand the second asset is a more conservative option whose return rate has a uniform distribution between 4% and 8%. The total risk involved with investing on asset-1 and two is measured by the variance of total return (VTR). The return rates of the given assets are known to be independent.

a) Formulate a mathematical model to find the optimal investment plan that maximizes the expected return without exceeding the VTR limit of V (dollar square).

b) Find the optimal solution for $V=\{10^{11}, 2\times10^{11}, 4\times10^{11}\}$. Discuss whether the solution you have found is a local or global optimum.

c) Now assume that it is not possible to invest more than $1M in asset-2 and solve the problem for $V=4\times10^{11}$ How does your solution in part b changes? What are the binding constraints?

d) Modify your formulation in part a to implement the regulation that total amount invested in asset-1 cannot be more than two times of the total amount invested in asset-2. Solve the problem with this new restriction and $V=4\times10^{11}$. What is the maximum return in this case? Comment on how is this solution different from the one you get in part b.