data609projetproposal

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Data 609 Project proposal - Mathematical Modeling Techniques for Data Analytics

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Aim:

** Use mathematical models to make a decision for portfolio optimization Investigating portfolio optimization with expected return on investiment in risk control **

Methodology:

** Use linear programming techniques to conduct an optimal allocation Use a quadratic programming approach to determine appropriate portfolio weights Determine the optimal allocation by given risk appetite and other portfolio constraints **

Data source:

** Historical stock price data are readily accessible using functions in "Quantmod" package The filtered data for this application selects total 9 stock cases from 2015 to August 2018 The datasets include the date, daily market close price, market volumes, the closing price will be used to make for portfolio optimization **

A sample show as below:

```
library(quantmod)
```

```
## Loading required package: xts

## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

## Loading required package: TTR

## Version 0.4-0 included new data defaults. See ?getSymbols.
```

```
# set begin-end date and stock namelist
begin_date <- "2015-01-01"
end_date <- "2018-08-31"
stock_namelist <- c("AAPL", "AMD", "ADI",  "ABBV", "AET", "A",  "APD", "AA","CF")

# download data from YahooFinance
```

```r
prices <- xts()
for (stock_index in 1:length(stock_namelist))
  prices <- cbind(prices, Ad(getSymbols(stock_namelist[stock_index],
                                        from = begin_date, to = end_date, auto.assign = FALSE)))
```

```
## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.
```

```
##
## WARNING: There have been significant changes to Yahoo Finance data.
## Please see the Warning section of '?getSymbols.yahoo' for details.
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.yahoo.warning"=FALSE).
```

```r
colnames(prices) <- stock_namelist
indexClass(prices) <- "Date"

tail(prices)
```

```
##              AAPL   AMD      ADI     ABBV      AET        A      APD    AA
## 2018-08-23 215.49 22.29 96.92332 96.12174 196.2070 65.55125 163.3468 42.02
## 2018-08-24 216.16 23.98 98.30666 96.36909 196.7756 65.84064 164.8866 43.44
## 2018-08-27 217.94 25.26 99.59048 96.98252 197.4040 65.94042 166.1980 43.87
## 2018-08-28 219.70 25.05 99.93880 96.23057 198.3616 66.54913 165.9198 44.25
## 2018-08-29 222.98 25.20 99.68999 96.54718 198.7706 66.86846 167.1915 45.13
## 2018-08-30 225.03 24.89 98.57000 95.76554 199.0698 67.11793 165.6417 44.37
##               CF
## 2018-08-23 49.46
## 2018-08-24 49.95
## 2018-08-27 50.63
## 2018-08-28 50.71
## 2018-08-29 51.64
## 2018-08-30 51.53
```