Portfolio optimization modeling

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A simple and contemporary way to model and solve complex portfolio optimization problems with R.
AML (algebraic modeling language) now available in R: ROML (R Optimization Modeling Language) package.

Access to different solvers for various problem classes based on the ROI (R Optimization Infrastructure) package (Hornik et al., 2016).

Portfolio optimization modeling language is built on top of the generalized AML: ROML.portfolio package.

All available on https://r-forge.r-project.org/.
How does it work?

**Minimum variance portfolio:**

```r
m <- model()
m$variable(portfolio, lb = 0)
m$minimize(markowitz(portfolio))
m$subject_to(budget_norm(portfolio))
```
How does it work?

Changing the risk-measure to 95% CVaR?

```r
m <- model()
m$variable(portfolio, lb = 0)
m$minimize(cvar(portfolio, 0.95))
m$subject_to(budget_norm(portfolio))
```
Extensive set of complex and creative risk and return-risk measures implemented, e.g.,

- Markowitz
- reward
- MAD
- Downside variance
- Downside MAD
- Sharpe
- CVaR
- Minimax Young
- Omega
- ... 

Different constraints: cardinality, turnover, ...

All standard functionalities of the generalized AML.
install.packages("ROML.portfolio", repos="http://R-Forge.R-project.org")
install.packages("ROML", repos="http://R-Forge.R-project.org")
library(ROML); library(ROML.portfolio)
data(djia2013)

m <- model()
m$variable(portfolio, lb = -1) # portfolio choice vector
m$maximize(reward(portfolio))
m$subject_to(cvar(portfolio, 0.95) <= 0.02)
m$subject_to(cvar(portfolio, 0.99) <= 0.03)
m$subject_to(turnover(portfolio) <= 0.5)
solution <- optimize(m, solver = "glpk", data = list(returns = djia2013))
Some examples ...

```r
m <- model()
m$variable(portfolio, lb = 0)
m$maximize(omega(portfolio))
m$subject_to(cardinality(portfolio) <= 7)
m$subject_to(cvar(portfolio, 0.95) <= 0.02)
m$subject_to(markowitz(portfolio) <= 0.03^2)

solution <- optimize(m, solver = "", data = list(returns = djia2013))
```
Thank you for your Attention

More infos on http://finance-r.com/portfolio/

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References