Dublin R Workshop on Bootstrapping

Mick Cooney
mickcooney@gmail.com

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1. Introducing the Bootstrap

Exercise 1.1 Using the code in file `basic_bootstrap.R`, run a basic bootstrap on the mean of the air conditioning data.

Exercise 1.2 Use the `boot.ci()` function to estimate the 95% confidence interval for bootstrapped mean.

Exercise 1.3 Generate random normal data using `rnorm()`, and summarise to the data.

Exercise 1.4 Run the bootstrap on the data to get some estimates on the mean of the data.

2. Using the Bootstrap with Regression

Exercise 2.1 Open up the code in `lm_bootstrap.R` and see what it is doing. Make sure you understand it.

Exercise 2.2 Run the code and examine the output.

3. Using the Bootstrap with Portfolio Optimisation

Exercise 3.1 Using the data in `equity_returns.rds`, and the function `portfolio.optim()` in the *tseries* package, calculate the optimum portfolio weights for the four equities given.

Exercise 3.2 Using the code in `portfolio_bootstrap.R`, run the bootstrap on the portfolio optimisation problem. Investigate the output. Use 120 days for each bootstrap.

Exercise 3.3 Investigate the effect of bootstrap sample size on the output of the bootstrap.

4. Using the Bootstrap with Time-series data

Exercise 4.1 Load the lynx data set and get an estimate for the order of the time-series using the `ar()` function.

Exercise 4.2 Run the bootstrap code in `ts_bootstrap.R`. Examine the code to understand what it is doing.

Exercise 4.3 Examine the output of the bootstrap and interpret its output.