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Resampling Method - Seminar 3
Math 567: Winter 2016

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The `jackknife` Resampling Method

The **jackknife** is a resampling technique developed by Maurice Quenouille (1949, 1956) and John Tukey (1958). It preceded the **bootstrap** thechnique, it's most used for **variance** and **bias** estimation.

1. **Estimation**

   To find the `jackknife` estimate of a parameter, we estimate the parameter for each subsample omitting the ith observation to estimate the previously unknown value of parameter.

   $$\bar{x}_i = \frac{1}{n-1}\sum_{j}^{n} x_j$$

   Variance Estimation

   An estimate of the variance of an estimator can be calculated using the jackknife technique.

   $$\mathrm{Var}_{(\mathrm{jack})} = \frac{n-1}{n}\sum_{i=1}^{n}(\bar{x}_i - \bar{x}_{(.)})^2$$

   $\bar{x}_i$ is the parameter estimate based on leaving out the ith observation, and $\bar{x}_{(.)}$ is the estimator based on all of the subsamples.

2. **The jackknife estimate of bias of our dataset using R language**

   First we install and load the `"bootrap"` package

   ```
   install.packages("bootstrap")
   library(bootstrap)
   ```

   load the data

   ```
   data <- read.csv('Seminar_2.csv', header = TRUE, sep = "")
   ```