

Bootstrap Method

ksnt

September 30, 2018

1 Algorithm

Data: $y_1, \dots, y_n \sim i.i.d. (\mu, \sigma_Y^2)$

Step1: Calculate mean and deviation

$$\begin{aligned}\overline{\mu_Y} &= \frac{1}{n} \sum_{i=1}^n y_i \\ \widehat{S_Y^2} &= \frac{1}{n-1} (y_i - \overline{\mu_Y})^2\end{aligned}$$

Step2: Repeat below S times (s=1,2,...,S) ¹

1. $y_1^B, \dots, y_m^B \sim (y_1, \dots, y_m)$ duplicated samples

2. $\overline{\mu_s^B} = \frac{1}{n} \sum y_i^B$

After repeat S times, we get $\overline{\mu_1^B}, \dots, \overline{\mu_S^B}$

Step3: Sort $\overline{\mu_1^B} < \overline{\mu_2^B}, \dots, < \overline{\mu_S^B}$ ²

95% Confidence interval is between $\overline{\mu_2^B}$ and $\overline{\mu_{S-1}^B}$

¹Usually, 1000 times needed. If could, 10000 times is better. Bigger number of repeat is better.

²Here, normal distribution is not assumed.