Bootstrap Method

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1 Algorithm

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

Step1: Calculate mean and deviation

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

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

1. $y_1^B, \ldots, y_m^B \sim (y_1, \ldots y_m)$ duplicated samples
2.$\overline{\mu_s^B} = \frac{1}{n}\sum_{i=1}^{n} y_i^B$
After repeat S times, we get $\overline{\mu_1^B}, \ldots, \overline{\mu_S^B}$

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

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

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

[2] Here, normal distribution is not assumed.