

Approximation of the parametric bootstrap distribution

Ulrich Halekoh and Søren Højsgaard

Department of Molecular Biology and Genetics
Aarhus University, Denmark

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1 Parametric bootstrap (PB)

Hej Søren, I think the point 2 in the slice we wanted to make is wrong.

- Point 2 and 3 are not equivalent (3 is correct)
- Point 4: I wonder whether you use f in this calculation.

Using parametric bootstrap

We consider the log-MLR statistic T and draw B parametric bootstrap samples t^1, \dots, t^B under the estimated null model $\hat{\theta}_0$.

Let f be the difference in the number of parameters between the null and the general model.

We use this sample to estimate the parametric bootstrap p-value $P_{\hat{\theta}_0}(T \geq t_{obs})$

- 1 directly
- 2 approximating the bootstrap distribution of T by a $\chi_{\tilde{f}}^2$ distribution (Bartlett correction)

Comment: if this is true, then because $\mathbb{E}_{bootdist}(T) = \mathbb{E}_{bootdist}(\tilde{t})$ we must have

$$\tilde{f} = \tilde{t}$$

and there is no place for f ! I think we must use the following statement:

- 3 We estimate the distribution of the scaled statistic $\frac{f}{\tilde{t}} \cdot T$ by a $\chi_{\tilde{f}}^2$ distribution (Bartlett correction)

Comment: now we have $\mathbb{E}_{bootdist} \frac{f}{\tilde{t}} \cdot T = f$.

- 4 approximating the bootstrap distribution by a $\Gamma(\alpha, \beta)$ distribution which mean and variance match the moments of the bootstrap sample.

Comment: Is it true that you here make no use of f ?