

0.1 Akaike Information Criterion

Akaike's information criterion is a measure of the goodness of fit of an estimated statistical model. The AIC was developed by Hirotugu Akaike under the name of "an information criterion" in 1971. The AIC is a **model selection** tool i.e. a method of comparing two or more candidate regression models. The AIC methodology attempts to find the model that best explains the data with a minimum of parameters. (i.e. in keeping with the law of parsimony)

The AIC is calculated using the "likelihood function" and the number of parameters (Likelihood function : not on course). The likelihood value is generally given in code output, as a complement to the AIC. Given a data set, several competing models may be ranked according to their AIC, with the one having the lowest AIC being the best. (Although, a difference in AIC values of less than two is considered negligible).

The Akaike information criterion is a measure of the relative goodness of fit of a statistical model. It was developed by Hirotugu Akaike, under the name of "an information criterion" (AIC), and was first published by Akaike in 1974.

$$AIC = 2p - 2\ln(L)$$

- p is the number of free model parameters.
- L is the value of the Likelihood function for the model in question.
- For AIC to be optimal, n must be large compared to p .

0.1.1 Schwarz's Bayesian Information Criterion

An alternative to the AIC is the Schwarz BIC, which additionally takes into account the sample size n .

$$BIC = p \ln n - 2\ln(L)$$

1 Information Criteria

We define two types of information criterion: the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC). In AIC and BIC, we choose the model that has the minimum value of:

$$AIC = 2\log(L) + 2m,$$

$$BIC = 2\log(L) + m\log n$$

where

- L is the likelihood of the data with a certain model,
- n is the number of observations and
- m is the number of parameters in the model.

1.1 AIC

The Akaike information criterion is a measure of the relative **goodness of fit** of a statistical model.

When using the AIC for selecting the parametric model class, choose the model for which the AIC value is lowest.