

Change-point model selection via AIC

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Abstract Change-point problems have been studied for a long time not only because they are needed in various fields but also because change-point models contain an irregularity that requires an alternative to conventional asymptotic theory. The purpose of this study is to derive the AIC for such change-point models. The penalty term of the AIC is twice the asymptotic bias of the maximum log-likelihood, whereas it is twice the number of parameters, $2p_0$, in regular models. In change-point models, it is not twice the number of parameters, $2m + 2p_m$, because of their irregularity, where m and p_m are the numbers of the change-points and the other parameters, respectively. In this study, the asymptotic bias is shown to become $6m + 2p_m$, which is simple enough to conduct an easy change-point model selection. Moreover, the validity of the AIC is demonstrated using simulation studies.

Keywords Brownian motion · Functional central limit theorem · Information criterion · Irregularity · Random walk · Structural change