

INFORMATION AMOUNT AND HIGHER-ORDER EFFICIENCY IN ESTIMATION

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Abstract. By means of second-order asymptotic approximation, the paper clarifies the relationship between the Fisher information of first-order asymptotically efficient estimators and their decision-theoretic performance. It shows that if the estimators are modified so that they have the same asymptotic bias, the information amount can be connected with the risk based on convex loss functions in such a way that the greater information loss of an estimator implies its greater risk. The information loss of the maximum likelihood estimator is shown to be minimal in a general set-up. A multinomial model is used for illustration.

Key words and phrases: Fisher information amount, decision theory, risk function, efficiency, maximum likelihood estimator, asymptotic theory, estimation, information loss.