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# ADAPTIVE ESTIMATION USING RECORDS DATA UNDER ASYMMETRIC LOSS, WITH APPLICATIONS

## Abstract:

We consider a scenario where data are accessible in terms of record values, as can happen in a wide range of practical situations. Examples include the hottest day ever, the lowest stock market figure, auction prices of an item in bidding, etc. Such data can be analyzed as record values from a sequence of observations, an upper or lower record value being one that is larger or smaller, respectively, than all previous observations. The literature on classical theory of records and its several variants is quite rich. A significant literature also exists in reliability theory and associated areas.

Not much work has, however, been done so far using records data when over and under estimation of the parameter of interest attract unequal penalties, even though there is a compelling need for considering such an asymmetric loss function whenever the consequences of over and under estimation are not identical. This can happen in such diverse fields of application as real estate management, accounting, reliability analysis, and so on.

From the above perspective, we consider the estimation problem based on records data for the scale parameter of an exponential family of distributions under an asymmetric linear-exponential loss function. With a view to controlling the associated risk, we also aim at ensuring a pre-assigned upper bound on it. In the absence of a known and fixed sample size solution to this problem, we consider an adaptive sampling methodology – for example, a one at a time purely sequential sampling rule. We suggest various estimators of the scale parameter and compare their performances to address the admissibility and other related issues. Monte-Carlo simulations lend strong support to our theory and methodology.

## Keywords:

Bounded risk; exponential family; LINEX loss function; purely sequential

**JEL Classification:** C18, C13, C00