

## Adjustments of profile likelihood through predictive densities

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Received: 30 November 2007 / Revised: 18 February 2009 / Published online: 24 February 2010  
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**Abstract** In this paper, a second-order link between adjusted profile likelihoods and refinements of the estimative predictive density is shown. The result provides a new interpretation for modified profile likelihoods that complements results in the literature. Moreover, it suggests how to construct adjusted profile likelihoods using accurate predictive densities.

**Keywords** Estimative predictive density · Modified profile likelihood · Nuisance parameter · Predictive pivot · Profile likelihood · Second-order asymptotics