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The efficiency of the second-order nonlinear least squares estimator and its extension

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Abstract We revisit the second-order nonlinear least square estimator proposed in Wang and Leblanc (Anne Inst Stat Math 60:883–900, 2008) and show that the estimator reaches the asymptotic optimality concerning the estimation variability. Using a fully semiparametric approach, we further modify and extend the method to the heteroscedastic error models and propose a semiparametric efficient estimator in this more general setting. Numerical results are provided to support the results and illustrate the finite sample performance of the proposed estimator.

Keywords Second-order least squares estimator · Heteroscedasticity · Moments · Semiparametric methods