

Semiparametric estimation of a two-components mixture of regression models

Laurent Bordes¹, Ivan Kojadinovic², Pierre Vandekerkhove³

SUMMARY

We consider a two-component mixture of regression models where one component is partially known while the other is unknown. More precisely we consider $(Y, X) \in \mathbb{R} \times \mathbb{R}^p$ such that

$$Y = \begin{cases} \alpha_0 + \beta'_0 X + \sigma \varepsilon_0 & \text{with probability } 1 - \pi, \\ \alpha + \beta' X + \varepsilon & \text{with probability } \pi. \end{cases}$$

where α_0 , β_0 and the density function (df) f_0 of ε_0 are known and $\sigma \in (0, +\infty)$, $\alpha \in \mathbb{R}$, $\beta \in \mathbb{R}^p$, $\pi \in (0, 1)$ and the df f of ε are the unknown parameters of the model. This model extends a previous model proposed in [1]. First we show that provided that $\beta \neq \beta_0$ the model parameters can be identified even if f is not an even density function. Then considering n i.i.d. copies of (X, Y) we propose some estimators of all the unknown parameters and we give their asymptotic behavior. For the functional part of the model we show that the covariance of the limit process can be approximated by using a weighted bootstrap approach. Some simulation results illustrate our results.

Keywords: Semiparametric, mixture, regression

AMS Classification: 62G05, 62G20, 62J05

References

- [1] L. BORDES, C. DELMAS AND P. VANDEKERKHOVE (2006). Estimating a two-component mixture model when a component is known. *Scand. J. Statist.* **33**(4), 733–752.

¹University of Pau - UMR CNRS 5142
laurent.bordes@univ-pau.fr

²University of Pau - UMR CNRS 5142
ivan.kojadinovic@univ-pau.fr

³University of Paris-Est Marne la Vallée - UMR CNRS 8050
pierre.vandekerkhove@univ-mlv.fr