Penalized distributed lag linear and non-linear models

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[1]This document is included as a vignette (a LaTeX document created using the R function `Sweave()`) of the package dlnm. It is automatically downloaded together with the package and can be simply accessed through R by typing `vignette("dlnmPenalized")`.

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1 Preamble

This vignette DLNMPENALIZED illustrates the extension of the R package dlnm to perform a penalized versions of distributed lag linear (DLMs) and non-linear models (DLNMs). This development is thoroughly described in Gasparrini et al. [2017].

The extension of the DLM/DLNM framework to penalized splines within generalized additive models is implemented by embedding the dlnm and mgcv packages. The latter is used primarily as a computational engine for the estimation of smoothed exposure-lag-response relationships, and to a some extent as a tool for deriving the parameterization of the basis functions and penalty terms. Specifically, two approaches to penalization are implemented in dlnm and described here.

A general overview of functions included in the package, with information on its installation and a brief summary of the DLNM methodology are included in the vignette DLNMOVERVIEW, which represents the main documentation of dlnm. The user can refer to that vignette for a general introduction to the package.

Please send comments or suggestions and report bugs to antonio.gasparrini@lshtm.ac.uk.

2 Penalized DLMs and DLNMs

This vignette is under development. For an illustration, refer to Gasparrini et al. [2017] and the R code included as supplementary material that reproduces the examples in the article.

References

A Gasparrini, F Scheipl, B Armstrong, and M G Kenward. A penalized framework for distributed lag non-linear models. *Biometrics*, (In Press), 2017.