Profile extrema for visualizing and quantifying uncertainties on excursion regions. Application to coastal flooding

In this short note we describe the material provided as supplemental to the submission “Profile extrema for visualizing and quantifying uncertainties on excursion regions. Application to coastal flooding”.

Installation

The supplementary material is on the git repository profileextrema_supplemental hosted on BitBucket.

In order to install the files locally, please git clone the repository with the command
git clone https://bitbucket.org/darioaz/profileextrema_supplemental.git

Material

The repository contains several R files, two R packages and a README Markdown file.

In particular, the two R packages are

profExtrema: the implementation of the methods described in the paper. Package also available on CRAN.

pGPx: the implementation of the methods described in Azzimonti et al. (2016) to obtain posterior quasi-realizations of a Gaussian process. Package also available on CRAN.

The main R files are

Section2_2.R: the main file to reproduce the results on the analytical 2d function presented in Section 2.2.

Section3_3.R: main file to reproduce the GP emulation results on the analytical 2d function presented in section 3.3

Section4_3_1.R: main file to reproduce the coordinate profile extrema results on the 5d coastal flooding test case.

Section4_3_2.R: main file to reproduce the bivariate profile extrema results on the 5d coastal flooding test case.

AppendixC*.R: files to reproduce the results shown in Appendix C, in particular Table 1 and Table 2.

AppendixE.R: main file to reproduce the results shown in Appendix E on the 3d analytical test function.
CoastalAux.R: auxiliary script that reads the coastal flooding data, sets up the folders where to save results and fits the GP model described in Section 4.1.3.

References

Azzimonti, D., Bect, J., Chevalier, C., and Ginsbourger, D. (2016). Quantifying uncertainties on excursion sets under a Gaussian random field prior. *SIAM/ASA Journal on Uncertainty Quantification*, 4(1):850–874.