

Penalized hyperbolic-polynomial splines

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1 Abstract e references

The advent of the P-splines, first introduced by Eilers and Marx (2010) [5], has led to important developments in data regression through splines. With the aim of generalizing polynomial P-splines, we have defined a model of *penalized* regression spline [4], called HP-spline, in which the polynomial B-spline functions are replaced by Hyperbolic-Polynomial bell-shaped basis functions. The starting idea is the definition of a polynomial-exponential smoothing spline, investigated in the framework of the Laplace transform inversion [1, 2, 3]. The HP-splines are defined as a solution to a minimum problem characterized by a discrete penalty term. They inherit from P-splines the advantages of regression models, for example to separate the data from the free nodes, so avoiding the problems of *overfitting* and consequent oscillations at the edges. HP-splines are particularly interesting in

different applications that require analysis and forecasting of data with exponential trend. We present some recent results on existence, uniqueness and properties to reproduce the HP-splines, also with the aim of extending their usage for data analysis.

References

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