

Smooth approximation of data and its application

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A way of data approximation called the *smooth approximation* was introduced by Talmi and Gilat [1]. In the contribution, we are concerned with mathematical as well as computational aspects of this smooth approximation of data.

Such an approach to approximation employs a (possibly infinite) linear combination of smooth basis functions with coefficients obtained as the unique solution of a variational problem. While the problem guarantees the smoothness of the approximant and its derivatives, the constraints represent the interpolating or smoothing conditions at nodes. Except for the constraints, the formulation of the variational problem can be chosen to comply with our particular requirements on the behavior of the approximating function between nodes, i.e. the formulation is not unique.

A special attention is paid to the basis system $\exp(ikx)$. Some 1D numerical examples are presented.

References

- [1] *A. Talmi, G. Gilat*: Method for smooth approximation of data. *J. Comput. Phys.* *23* (1977), 93–123.