On the numerical convergence and properties of the Iterative Filtering method for the analysis of nonlinear and nonstationary signals

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The decomposition and analysis of nonstationary and nonlinear signals are of great interest both from a theoretical and an applied standpoint. Among possible applications we mention, for instance, the refining of nondestructive techniques for the identification of faults in buildings or machineries; the identification of hidden quasiperiodicities and long term behaviors in a time series like the average troposphere temperature, a financial index, or the terrestrial magnetic field driven by the solar wind [3].

Standard techniques like Fourier or wavelet Transform are unable to properly capture nonlinear and nonstationary phenomena. For this very reason in the last two decades several ad hoc methods have been proposed in the literature. Among them there is the so called Iterative Filtering method [1, 2, 4], whose numerical convergence and stability was not completely understood so far.

In this talk we quickly overview previously developed methods, we introduce a complete numerical convergence of Iterative Filtering, we provide details about its properties and show some numerical examples.

References

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