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Automatic Differentiation for error analysis

Automatic Differentiation (AD) allows to determine exactly the Taylor series of any function truncated at any order. Here we propose to use AD techniques for data analysis. We will see that AD techniques allows for easy and exact error propagation in arbitrary quantities, even those defined via iterative algorithms. The case of special interest where AD techniques are used to estimate the error in fit parameters will be discussed in detail.

We will show several applications of this analysis tools using a freely available Julia reference implementation.

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