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Automatic Differentiation in ROOT

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Automatic Differentiation is a powerful technique to evaluate the derivative of a function specified by a computer program. Thanks to the ROOT interpreter, Cling, this technique is available in ROOT for computing gradients and Hessian matrices of multi-dimensional functions.
We will present the current integration of this tool in the ROOT Mathematical libraries for computing gradients of functions that can then be used in numerical algorithms.
For example, we demonstrate the correctness and performance improvements in ROOT's fitting algorithms.
We will show also how gradient and Hessian computation via AD is integrated in the main ROOT minimization algorithm Minuit.
We will show also the present plans to integrate the Automatic Differentiation in the RooFit modelling package for
obtaining gradients of the full model that can be used for fitting and other statistical studies.

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