

## Automatic Differentiation Of Algorithms

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In mathematics and computer algebra, automatic differentiation (AD), also called algorithmic differentiation, computational differentiation, auto-differentiation, or simply autodiff, is a set of techniques to numerically evaluate the derivative of a function specified by a computer program.

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Automatic differentiation---the mechanical transformation of numeric computer programs to calculate derivatives efficiently and accurately---dates to the origin of the computer age. Reverse mode automatic differentiation both antedates and generalizes the method of backwards propagation of errors used in machine learning. Despite this, practitioners in a variety of fields, including machine learning, have been little influenced by automatic differentiation, and make scant use of available tools.

Automatic Differentiation of Algorithms for Machine ...

Differentiation shows up everywhere from the backprop algorithm in deep neural networks to the equations of motion in physics and to pretty much any field that needs to quantify a rate of change....

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In this case, automatic differentiation (AD) procedures, which provide a numerical algorithm to compute the gradient without the need of an analytical derivative and also without the drawbacks of a...

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Automatic Differentiation of Algorithms. View/ Open. 102771.pdf (PDF, 306Kb) Author. Bartholomew-Biggs, M. Brown, S. Christianson, B. Dixon, L. Attention. 2299/3010. Abstract. We introduce the basic notions of Automatic Differentiation, describe some extensions which are of interest in the context of nonlinear optimization and give some ...

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Automatic Differentiation of Algorithms: From Simulation ...

Automatic Differentiation is a technique for augmenting computer programs with statements for the computation of derivatives based on the chain rule of differential calculus. The ADIFOR 2.0 system provides automatic differentiation of Fortran 77 programs for first-order derivatives.

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