Faure, Christéle

Splitting of algebraic expressions for automatic differentiation. (English) Zbl 0871.65013

Berz, Martin (ed.) et al., Computational differentiation: techniques, applications, and tools. Proceedings of the second international workshop on computational differentiation, February 12–14, 1996. Philadelphia, PA: SIAM. 117-127 (1996).

The number of products needed for the computation of a function and its first derivative is less than three times the number of essential products needed for the computation of the function itself, if each expression is split into binary subexpressions. We have implemented a split facility in Odyssée to fit this theoretical idea. Odyssée takes a set of subroutines as input and generates a new set of subroutines that compute the derivatives in forward or reverse mode. In practice, the decrease of the number of products does not lead to a decrease of run time, because recurrent compilers do some sharing equivalent to a partial split and mismanage memory related to split variables.

For the entire collection see [Zbl 0857.00033].

Reviewer: Sven Ehrich (Hildesheim)

MSC:

65D25 Numerical differentiation

Keywords:

numerical differentiation; complexity; split; algebraic expressions; Odyssée

Software:

Odyssee