

Pascual, Valérie; Hascoët, Laurent

Extension of TAPENADE toward Fortran 95. (English) [Zbl 1270.68057](#)

Bücker, Martin (ed.) et al., Automatic differentiation: Applications, theory, and implementations. Selected papers based on the presentation at the 4th international conference on automatic differentiation (AD), Chicago, IL, USA, July 20–23, 2004. Berlin: Springer (ISBN 3-540-28403-6/pbk). Lecture Notes in Computational Science and Engineering 50, 171-179 (2006).

Summary: We present extensions to the automatic differentiation tool TAPENADE to increase coverage of the Fortran 95 language. We show how the existing architecture of the tool, with a language independent kernel and separate front-ends and back-ends, made it easier to deal with new syntactic forms and new control structures. However, several new features of Fortran 95 required us to make important choices and improvements in TAPENADE. We present these features, sorted into four categories: about the top-level structure of nested modules, subprograms, and interfaces; about structured data types; about overloading capabilities; and about array features. For each category, we discuss the choices made, and we illustrate their impact on small Fortran 95 examples. Dealing with pointers and dynamic memory allocation is delayed until extension to C begins. We consider this extension to Fortran 95 as a first step towards object-oriented languages.

For the entire collection see [\[Zbl 1084.65002\]](#).

MSC:

[68N15](#) Theory of programming languages

Cited in **3** Documents

Keywords:

[TAPENADE](#); [Fortran 95](#); [program transformation](#)

Software:

[TAPENADE](#)