

Re: complexity of numerical software

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Jean-Claude Arbaut wrote:

Jaap Spies wrote:

[...]

I you write a new CAS, it would be silly to use only those "standard" libraries: they compute with IEEE754, hence the precision is very limited for a CAS. You'd probably prefer a multiprecision library, but I don't know of a standard one... GMP and others only compute with integers, but you need approximate values of many transcendental functions.

Yes, GMP and
MPFR: <http://www.mpfr.org/>
are the candidates.

I will never, never make the mistake, as I did some 20 years ago to write my own multiprecision software! At that time there was no real alternative, but ...

You'll also need to write special algorithms for that, since the problem of computing with high precision numbers or with rationals have its own difficulties: among others, how do you reduce the size of numbers (to increase speed) appearing in computations, like the solution of a linear system of equations. These are also numerical computations, though not the classical "number crunching" BLAS.

Re: complexity of numerical software

Sure!

Oh, and just an idea: what is **really** a CAS ? I have already used Maple, Mathematica and MuPAD, and then I discovered GAP: no more "formal" computations, but "true" mathematical objects :-) I mean, it looks like in Maple, the elementary object is an "expression", which can be almost anything. In GAP, there are no expressions, only values: polynomials, finite groups, matrices, are `_values_`. That makes a great difference I think. Maybe I'm wrong...

Values -- Objects. The design of Maple (and Mathematica) is flawed. OK, understandable seeing the history, but opening new ways cost a lot. Are we prepared to pay for it?

Bringing together the good stuff is a possibility, as I mentioned in the original thread:

<http://modular.ucsd.edu/sage/index.html>

Good for doing mathematics, but not for engineering applications as RJF pointed out! And supposedly to die soon!?

Jaap

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