

## Re: GPL vs LGPL vs CAS

**Source:** <http://sci.tech-archive.net/Archive/sci.math.symbolic/2005-02/0006.html>

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> *Since the same issue comes up in other software, including  
> numerical computation, graphics, and facilities as  
> diverse as browsers, it seems to me that the particular  
> perspective of CAS would not add much to the discussion.*  
>

I would not say it is the same for e.g. browsers than for  
CAS or numerical computation software.

>> *And there is one deeper question: the development of science  
>> is an open process, therefore the software for science should  
>> also be open*  
>  
>  
> *I do not know why you say this. As far as I can tell  
> the development of computers and related science has not  
> been an open process. Konrad Zuse, Bletchley Park, come  
> to mind. The development of weapons and drugs.*  
>

I believe that many scientific people would agree that the development  
of science in their field is open. There are a few exceptions of  
course, especially when military applications are not far.  
For our subject, I think the question is where you draw  
the boundary between CAS and commodity software. For  
example, I don't think that a CAS researcher needs to look  
at a browser source code, but I believe that if he want  
to experiment new CAS algorithms, it would be better for him  
to have access to the source code of a CAS. Otherwise, he  
might never know if his algorithm is faster or not, just  
because he will for example compare an interpreted and a  
compiled algorithm, or he will not use efficient data  
structures.

>  
> *: the source code of the algorithms in a CAS*  
>

>> *should be published (I don't know for interfaces, but the  
>> distinction could be done, and proprietary interfaces could  
>> certainly work over open-source computing software much like  
>> proprietary software work with the linux kernel).*  
>  
>  
> *I think that you are expressing a preference. I  
> generally agree with it. It is not something you and  
> I control.*

If everybody in the CAS community had the same preferences,  
we might have an open-source CAS in the top 2 CAS.

>> *There are however most probably academic positions in the corresponding  
>> fields of maths or computer science, and I don't see why contributing  
>> to an open CAS could not be seen as a research publication,  
>> therefore the number is \$0 only because people in these academic  
>> positions do not see software development as research.*  
>  
>  
> *Because the US funding agencies do not see system building  
> as research, professors who do CAS-related work must propose  
> something else to get funding from NSF, DARPA, DOE, ONR,  
> NSA, in the United States.*  
>

Humm, I wonder who decides in the US funding agencies? I mean  
the people who decide take certainly some advices in the  
scientific community, therefore the fault for getting no  
funding for open CAS development would be the community fault.

> *The (European) idea that a professor has automatic  
> funding and can run a project, with students and staff, without  
> external funding has good and bad aspects. It might allow  
> the development of a new CAS, at least for a while. But then  
> it runs out.*  
>

Why would it run out much more than a commercial CAS?

> *In the US, my experience is the persons who promote faculty members  
> in mathematics do not see writing programs as the equivalent of  
> publication.*

That's in phase with my guess for no-CAS development funding

>> *mupad is more open than other commercial systems  
>> (except for the kernel).*  
>  
>  
> *My impression is that Maple code can be viewed, except for*

- > *comments, and except for the kernel, by anyone with access*
- > *to Maple. This is not free, but I have definitely benefited*
- > *from looking at how Maple did some things to understand*
- > *its behavior or even bugs.*
- >

If you mean tricks like `interface(verboseproc=...)`, I agree that it gives a few indications, but reading commented source code is much better than this kind of code.

- > *But completing a system to the point of robust packaging,*
- > *delivery, technical support, porting to new hardware etc etc*
- > *is not part of academic software. That is when industrial*
- > *and commercial partnerships play a role. At that point GPL*
- > *interferes with technology transfer. The "BSD" or "MIT" license*
- > *is much better for this (that is, you can use it, but don't*
- > *sue us if it doesn't work). My university would much*
- > *prefer technology transfer to be done by specific licenses*
- > *but my colleagues and I try to avoid this.*
- >

I don't see why GPL interferes, there are now many proofs of viable economic models built over GPL softwares.

I don't say that an open-source CAS should automatically be GPL, I just find that the balance of power is not fair with the academic (or geeks) software developers with BSD kind of licenses.

- >> *New developments require therefore*
- >> *time (they need to catch up the improvements in CAS algorithms*
- >> *made during the 10 or 20 last years),*
- >
- >
- > *I do not believe that, beyond a certain point of competence that*
- > *the algorithm improvements are the key*
- > *at all. The set of features does not increase because there*
- > *is (say) a faster FFT algorithm for multiplying polynomials.*
- > *Most of the algorithms in Maxima date from 1980, but this*
- > *includes a sparse modular GCD, an polynomial factoring*
- > *algorithms that is probably good enough for most applications,*
- > *etc.*
- > *In fact I would guess that the theoretical asymptotic  $O(f(n))$*
- > *improvements*
- > *that have filled the last 20 years of journals are of remarkably*
- > *little impact on systems like Mathematica, Maple. They make*
- > *their mark by what computations can be done, e.g. look*
- > *at Wester's benchmarks. Asymptotic timing is probably not*
- > *so important!*
- >

Some of the articles may have no impact on major CAS, but I would certainly never say that no important progress happened in

this field during the last 20 years, Groebner basis comes immediately to mind, but there are certainly a lot of other important improvements, especially because computers are so much more powerful now, so that people had the opportunity to experiment a lot more. I don't find your example of GCD computation very convincing, it is clear that this algorithm was one of the first to be studied, you would expect less progress for this algorithm than for algorithms that were too time-consuming to play with 20 years ago.

>> *it is not clear that they will do these improvements*  
>> *and expand outside of their initial*  
>> *users. If for example axiom had been developed openly from*  
>> *scratch, it would probably be much more different.*  
>>  
> *I see no reason to believe this. I suspect that for the*  
> *longest part of its development as Scratchpad, anyone expressing*  
> *an interest in participating could look at it and help. After*  
> *some brief discussion (and a long delay because of IBM lawyers),*  
> *I actually got a free computer (IBM-RT) and Scratchpad at*  
> *Berkeley for experimentation.*  
>

But you are not "anyone", do you really believe that IBM would have given me or anyone interested in CAS development a free license to use and modify the source of Scratchpad?

> *I would prefer to see the largest number people to use my software.*  
> *The idea that we could force Maple or Mathematica to become "free"*  
> *by making our code GPL seems unlikely. Our code could be*  
> *rewritten if it mattered.*  
>

I don't believe we can force Maple or MMA to become free, but we can certainly influence their policy. Much like linux development has influence on Microsoft. And first let's stop to offer them our work without honest counterpart! Fortunately there is some competition today between Maple and Mathematica and others, but just imagine what would happen if one of them would fail and the other remain in a monopoly situation?