CoCoALib - Feature #1633

Make polynomial multiplication interruptible?

16 Nov 2021 20:32 - John Abbott

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Status:	Closed	Start date:	16 Nov 2021
Priority:	Normal	Due date:	
Assignee:	John Abbott	% Done:	100%
Category:	Improving	Estimated time:	0.99 hour
Target version:	CoCoALib-0.99800	Spent time:	0.90 hour
Description			

I tried a (daft) example during an exercise class today: when tried to square a large polynomial it was not possible to interrupt CoCoA-5.

```
f := 1+2*x-2*x^2+4*x^3+4*x^4;
g := f*subst(f,x,x^7);
h := g*subst(g,x,x^63);
k := h*subst(h,x,x^4095);
NumTerms(k); --> 390625
NumTerms(k^2); -- NOT INTERRUPTIBLE!!
```

Should we make polynomial multiplication interruptible? It is quite rare that one performs such a daft computation, and it would be a shame to impose unnecessary overhead on all products just because sometimes one might try to compute a large product.

Related issues:

Related to CoCoALib - Feature #718: Insert calls to CheckForInterrupt

Closed

21 May 2015

History

#1 - 16 Nov 2021 20:33 - John Abbott

One crucial factor is how much overhead it would cost if we put a check inside some inner loop.

Also how many different impls of polynomial multiplication are there? Should we put checks in all of them?

#2 - 16 Nov 2021 20:34 - John Abbott

- Related to Feature #718: Insert calls to CheckForInterrupt added

#3 - 17 Nov 2021 11:50 - John Abbott

The relevant source code is probably myMul in SparsePolyOps-RingElem.C around line 413.

#4 - 17 Nov 2021 11:53 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

Here is a simpler test example

/**/ f := (x^10000-1)/(x-1); /**/ t0 := CpuTime(); NoPrint := f^2; TimeFrom(t0); The normal version of CoCoA-5 (without interrupt checking) takes about 6.3-6.4s on my linux box.

#5 - 17 Nov 2021 11:59 - John Abbott

- Assignee set to John Abbott

I have just inserted a CheckForInterrupt in the main loop for multiplication.

The simpler test example from comment 4 was not significantly slower (actually, it was faster, but that makes no sense).

I checked also that the multiplication is interruptible.

#6 - 17 Nov 2021 12:04 - John Abbott

This is weird. I reverted to the old code because I wanted to confirm that it is not interruptible. Indeed, it took a long time to recognize the interrupt, but the timer reported that the interrupt was recognised after about 4.2s. Where do the other 2.1s go? Assignment? Worrying!

#7 - 28 Jan 2022 13:08 - John Abbott

- Status changed from In Progress to Feedback
- % Done changed from 10 to 90

#8 - 04 Feb 2022 21:24 - John Abbott

- Status changed from Feedback to Closed
- % Done changed from 90 to 100
- Estimated time set to 0.99 h