CoCoALib - Feature #780

GroebnerFan/ExternalLib-GFan: improve package

24 Sep 2015 18:16 - Anna Maria Bigatti

Status:	In Progress	**Start date:**	24 Sep 2015
Priority:	Normal	**Due date:**	
Assignee:	Anna Maria Bigatti	**% Done:**	20%
Category:	Improving	**Estimated time:**	20.00 hours
Target version:	CoCoALib-1.0	**Spent time:**	6.00 hours

Description

First prototype is working.
Investigate and improve it, and implement it in cocoalib.

Related issues:

Related to CoCoALib - Feature #762: ExternalLib-GFan: first prototype	**Closed**	**28 Aug 2015**
Related to CoCoA-5 - Feature #903: New function CallOnGroebnerFanIdeals: call...	**Closed**	**04 Jul 2016**
Related to CoCoALib - Slug #1049: GroebnerFan: slow examples	**In Progress**	**19 Apr 2017**

History

#1 - 24 Sep 2015 18:22 - Anna Maria Bigatti

- Status changed from New to In Progress

- % Done changed from 0 to 20

In the package there are lots of operations on integers and those would surely be faster in cocoalib (at some point).

But I did make some improvements:
- the function "matrix" in cocoa-5, using the function SetRow (and that's good in general ;-)
- a minor improvement in MarkedPolynomialsToInequalities (just to touch fewer INTs)
- in GroebnerBasisFlip: ideal(apply(f, gens(I))) instead of ideal(apply(f, GBasis(I)))   (the ideals are equal, and gens are generally simpler and fewer)

With these changes I get the answer in 68s instad of 82s.
(That's a decent start)

```
  /**/ Use R ::= QQ[a,b,c];
  /**/ I := ideal(a^5+b^3+c^2-1, b^2+a^2+c-1, c^3+a^6+b^5-1);
  /**/ l:=AllReducedGroebnerBases(I);  len(l);
```

What I find strange is that I get these two cumulative times:
GFanGetFacets: 21.999sec
GFanRelativeInteriorPoint: 4.599sec
and these alone take much longer than the complete computation in gfan.
Can the overhead be so bad?

#2 - 16 Feb 2016 18:04 - Anna Maria Bigatti

- Target version changed from CoCoALib-0.99540 Feb 2016 to CoCoALib-0.99542 spring 2016

#3 - 22 Mar 2016 18:00 - Anna Maria Bigatti

- Target version changed from CoCoALib-0.99542 spring 2016 to CoCoALib-1.0

#4 - 04 Jul 2016 11:44 - Anna Maria Bigatti

- Related to Feature #903: New function CallOnGroebnerFanIdeals: call function on GFan ideals added

#5 - 19 Apr 2017 18:44 - Anna Maria Bigatti

- Related to Slug #1049: GroebnerFan: slow examples added

#6 - 20 Apr 2017 10:02 - Anna Maria Bigatti

Abbott found this gives error ([#1049](#))

```
GroebnerFanIdeals(ideal(x*y,y^3+x,y^3));
```

I investigated: it's an error in ReducedGBasis (argh)

#7 - 21 Apr 2017 11:06 - Anna Maria Bigatti

- Subject changed from ExternalLib-GFan: improve package to GroebnerFan/ExternalLib-GFan: improve package