CoCoA-5 - Bug #1640

MinSubsetOfGens does not find min subset

08 Dec 2021 00:08 - John Abbott

Status:	Closed	**Start date:**	08 Dec 2021
Priority:	Normal	**Due date:**	
Assignee:	Anna Maria Bigatti	**% Done:**	100%
Category:	bug	**Estimated time:**	1.66 hour
Target version:	CoCoA-5.4.2	**Spent time:**	1.63 hour

Description

Not sure what MinSubsetOfGens does, but it does not find a min card subset of the gens which generate the same ideal

```
use P ::= ZZ/(101)[x,y,z,t];
I := ideal([x^4*y*z +x^2*y^2*z^2 +z^6 +x^3*y^2 +y^3*z,
            y^5*z +x^3*y^2 +x*z^4 +x^3*y +x*z^2]);
RGB := ReducedGBasis(I);
ideal(first(RGB,2)) = ideal(first(RGB,7)); --> true
M := MinSubsetOfGens(ideal(first(RGB,7))); -- be patient!
len(M) = 4;  -- WRONG!
```

Related issues:

Related to CoCoA-5 - Slug #1638: MinSubsetOfGens sometimes very slow	**New**	**06 Dec 2021**

History

#1 - 08 Dec 2021 00:09 - John Abbott

I had wanted to show MinSubsetOfGens to my students, but maybe it is better not to do so.

The code is weird; I am not sure what it does.

#2 - 08 Dec 2021 00:11 - John Abbott

I have now re-read the manual, and understood what it was trying to say.
Maybe re-write the manual entry to make it clearer?

#3 - 09 Dec 2021 10:18 - Anna Maria Bigatti

- Description updated

#4 - 09 Dec 2021 10:27 - Anna Maria Bigatti

John Abbott wrote:

> I have now re-read the manual, and understood what it was trying to say.
> Maybe re-write the manual entry to make it clearer?

Better like this?

```
NOTE: there no guarantee that <tt>S</tt> is the minimal subset with smallest cardinality.
```

#5 - 10 Dec 2021 15:16 - John Abbott

- Related to Slug #1638: MinSubsetOfGens sometimes very slow added

#6 - 10 Dec 2021 15:53 - Anna Maria Bigatti

During skype meeting, we implemented an improvement (discarding longest polynomial first). Now the given example is much faster (and returns the original 2 generators).

#7 - 10 Dec 2021 15:54 - Anna Maria Bigatti

- Status changed from New to Feedback

- Assignee set to Anna Maria Bigatti

- % Done changed from 0 to 80

#8 - 20 Jan 2022 20:32 - John Abbott

- % Done changed from 80 to 90

Unfortunately I have lost the specific example (but I suppose a new one could easily be created).
I did notice the following "phenomenon":
let RGB be a reduced GB ordered so that LTs are increasing (this is what CoCoA does anyway?)

- it was slow checking if first 2, first 3, first 4 etc gens produce the same ideal;
- it was quite fast to check if all-but-last, all-but-last-2, etc produce the same ideal.

We should test this before closing.

#9 - 21 Jan 2022 10:10 - John Abbott

- Status changed from Feedback to Closed

- % Done changed from 90 to 100

- Estimated time set to 1.66 h

We had effectively already taken into account the comment 5 above.

Anna has just changed the code slightly to order by LT (previously ordered based on NumTerms).

Closing.