

CoCoALib - Slug #1739

IsHomog for ideals

05 May 2023 09:31 - Anna Maria Bigatti

Status:	Closed	Start date:	05 May 2023
Priority:	Normal	Due date:	
Assignee:	Anna Maria Bigatti	% Done:	100%
Category:	Improving	Estimated time:	2.01 hours
Target version:	CoCoALib-0.99850	Spent time:	1.75 hour
Description			
the function IsHomog for ideals might take a long time computing a GBasis, but if the check IsHomog(gens(I)) gives true, it should immediately return true without further computations.			
Related issues:			
Related to CoCoALib - Feature #1784: Add flag IhaveHomogGensValue for ide...		New	01 Mar 2024
Related to CoCoALib - Feature #1785: Add function IsHomog3(I)?		New	01 Mar 2024

History

#1 - 13 Jan 2024 22:16 - John Abbott

- Target version changed from CoCoALib-0.99800 to CoCoALib-0.99850

This should be easy to implement, right?

I was wondering how often one would want to know whether an ideal is homog without shortly afterwards wanting a GBasis?

I presume that if the ideal is not homog then one must compute the GBasis, right?

#2 - 31 Jan 2024 22:14 - John Abbott

- Status changed from New to In Progress

I say impl the suggestion in the main description: it should be very little code, and may make some computations faster.

Are there any other short-cuts?

If IsZeroDim(I) then it is not homog. I can think of other possible short-cuts, but would they ever be applicable? For instance, if there is a non-homog generator using indets $x[1], \dots, x[n]$ and all other gens use only other indets... How often does this happen?

reply IsZeroDim(I) requires a GBasis, so it's not a real shortcut.

#3 - 01 Feb 2024 09:47 - John Abbott

Source is in SparsePolyOps-ideal.C:908 more or less

#4 - 01 Feb 2024 09:50 - John Abbott

Could it be useful to have also **IsHomog3** which returns a bool3?

#5 - 05 Feb 2024 12:21 - Anna Maria Bigatti

Fixed. Now checking if gens are monomial, then if gens are homogeneous.

```
/**/ use R ::= QQ[a,b,c,d,e,f];
/**/ L := monomials(sum(indets(R)^25); len(L);
142506
```

```
/**/ IL := ideal(L); t0 := CpuTime(); IsHomog(IL); TimeFrom(t0); -- monomial gens
true
0.003
/**/ L[len(L)] := a+b;
/**/ IL := ideal(L); t0 := CpuTime(); IsHomog(IL); TimeFrom(t0); -- last gen non monomial
true
0.028
/**/ IL := ideal(L); t0 := CpuTime(); GB := GBasis(IL); TimeFrom(t0);
--> very long time
```

#6 - 16 Feb 2024 17:51 - Anna Maria Bigatti

- Status changed from In Progress to Resolved

- % Done changed from 10 to 80

check if there is a "homog" flag to be set

#7 - 01 Mar 2024 14:36 - Anna Maria Bigatti

- Related to Feature #1784: Add flag *IhaveHomogGensValue* for ideals in *SparsePolyRing*? added

#8 - 01 Mar 2024 14:37 - Anna Maria Bigatti

Anna Maria Bigatti wrote:

check if there is a "homog" flag to be set

The answer is "no" ([#1784](#)).

#9 - 01 Mar 2024 14:48 - Anna Maria Bigatti

John Abbott wrote:

Could it be useful to have also **IsHomog3(l)** which returns a bool3?

it could be handy to have a function: it is not entirely trivial to write a quick check on the generators, if one needs it. On the other hand, it is useful anywhere?

Usual philosophical question: it is good to add functions whose utility is uncertain? I'm inclined to postpone this into a new issue.

#10 - 01 Mar 2024 14:51 - Anna Maria Bigatti

- *Related to Feature #1785: Add function IsHomog3(l)? added*

#11 - 01 Mar 2024 14:57 - Anna Maria Bigatti

- *Status changed from Resolved to Closed*

- *% Done changed from 80 to 100*

- *Estimated time changed from 1.00 h to 2.01 h*