

CoCoA-5 - Bug #1604

SqFreeFactor crashes over non-perfect field

27 Jul 2021 14:42 - Florian Walsh

Status:	In Progress	Start date:	27 Jul 2021
Priority:	Normal	Due date:	
Assignee:		% Done:	10%
Category:	bug	Estimated time:	0.00 hour
Target version:	CoCoA-5.4.2	Spent time:	3.10 hours
Description			
<p>It seems like SqFreeFactor only works over perfect fields, but CoCoA does not check whether the ring is defined over a perfect field. The following code leads to a segmentation fault.</p>			
<pre>R ::= ZZ/(2)[a]; K := NewFractionField(R); Use K[x,y]; SqFreeFactor(x^2+a);</pre>			
<p>Radical also crashes, probably because it uses SqFreeFactor.</p>			
<pre>R ::= ZZ/(2)[a]; K := NewFractionField(R); Use K[x,y]; I := Ideal(x^2+a, y^2+a);</pre>			

History

#1 - 28 Jul 2021 22:31 - John Abbott

- Category set to bug
- Target version set to CoCoA-5.4.0

The problem appears to be an infinite loop inside **PthRoot** (in ring.C:1220--1250). For some reason the iterator seems never to end. It's too late to investigate further now.

The problem is almost certainly in CoCoALib.

#2 - 29 Jul 2021 10:51 - John Abbott

- Status changed from New to In Progress
- % Done changed from 0 to 10

Correction: the problem seems to be that SqfreeFactorCharP goes into an infinite loop.

The call to IteratedPthRoot returns the original poly, but this is not tested for. Is there an input violation? Or a mathematical bug?

I'll investigate later.

#3 - 30 Jul 2021 11:14 - John Abbott

The following test case still fails

```
R ::= ZZ/(2)[a];  
K := NewFractionField(R);  
Use K[x,y];  
SqFreeFactor((x^2+a)*(x^2+a^3)^2); -- gives just 1 factor of deg 6
```

#4 - 10 Nov 2021 19:34 - John Abbott

- Target version changed from CoCoA-5.4.0 to CoCoA-5.4.2

No real chance of finding time to resolve this in the foreseeable future :(
Probably not that hard, but it will surely require time.
Any volunteers?

#5 - 28 Sep 2022 15:00 - John Abbott

STATUS 2022-09-28:

The original failing cases are now apparently OK.

The example in comment 3 still incorrectly returns the whole deg 6 poly (instead of 2 factors).