CoCoALib - Bug #1789

GradingMat with negative weights should complain (or deal with them properly!!)

12 Mar 2024 08:23 - Anna Maria Bigatti

Status:	Closed	**Start date:**	12 Mar 2024
Priority:	Urgent	**Due date:**	
Assignee:	Anna Maria Bigatti	**% Done:**	100%
Category:	Improving	**Estimated time:**	0.00 hour
Target version:	CoCoALib-0.99850	**Spent time:**	1.60 hour

Description

```
W:=mat([[0,1],[1, -1]]);
O:=MakeTermOrdMat(W);
P:=NewPolyRing(QQ,"x,y",O,2);
Use P;
wdeg(y);  ---->  [1,  0]    WRONG
```

2024-03 new function name: NewPolyRingWeights(QQ,"x,y",W);

Related issues:

Related to CoCoALib - Support #1761: MakeTermOrdMat: improve error mesg	**Closed**	**06 Aug 2023**
Related to CoCoALib - Design #832: Generalize grading matrix	**New**	**04 Dec 2015**
Related to CoCoA-5 - Feature #823: NewPolyRing with weights -- better interface?	**Closed**	**26 Nov 2015**

History

#1 - 12 Mar 2024 12:19 - Anna Maria Bigatti

- % Done changed from 0 to 20

I investigated and found the confusion: in the lines

```
W:=mat([[0,1],[1, -1]]);
O:=MakeTermOrdMat(W);
P:=NewPolyRing(QQ,"x,y",O,2);
Use P;
wdeg(y);  ---->  [1,  0]    WRONG
```

The call O:=MakeTermOrdMat(W); actually changes W (because it just makes a new ordering compatible with W): O is [[0, 1], [1, 0]] and it is passed as OrdMat.

However the problem presists (I guess for the same internal implementation) in the shortcut call

```
/**/ P := NewPolyRing(QQ,"x,y", mat([[0,1],[3,-4]]));  use P;
/**/ wdeg(y);
[1,  0]
```

whereas it is properly detected in the complete call:

```
/**/ P := NewPolyRing(QQ,"x,y", mat([[0,1],[3,-4]]), 2);  use P;
--> ERROR: NOT YET IMPLEMENTED -- please be patient, we're working on it
--> [CoCoALib] MatrixOrdering32bitImpl: temporarily requiring weights to be non-negative
--> P := NewPolyRing(QQ,"x,y", mat([[0,1],[3,-4]]), 2);  use P;
-->       ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

#2 - 12 Mar 2024 20:39 - John Abbott

- Status changed from New to In Progress

The documentation says that if the grading-dim is not specified then it is taken to be 0. Perhaps this is misleading default behaviour? Maybe the default should be the number of rows? [do we require the rows to be in lin indep?]

#3 - 12 Mar 2024 20:40 - John Abbott

- Description updated

#4 - 13 Mar 2024 20:47 - John Abbott

- Related to Support #1761: MakeTermOrdMat: improve error mesg added

#5 - 13 Mar 2024 20:48 - John Abbott

- Related to Design #832: Generalize grading matrix added

#6 - 14 Mar 2024 08:55 - Anna Maria Bigatti

- Related to Feature #823: NewPolyRing with weights -- better interface? added

#7 - 14 Mar 2024 09:51 - Anna Maria Bigatti

John Abbott wrote:

> The documentation says that if the grading-dim is not specified then it is taken to be 0. Perhaps this is misleading default behaviour? Maybe the default should be the number of rows? [do we require the rows to be in lin indep?]

I cannot find the documentation. But it does take the number of rows.
The implementation in SparsePolyRing.C

```
  SparsePolyRing NewPolyRing(const ring& CoeffRing, const std::vector<symbol>& IndetSyms, ConstMatrixView Ws)
```

does the trivial thing (calling MakeTermOrdMat(Ws)) and no specific checks whatsoever.

We had suggested, in [#823](#823), to call such function NewPolyRingWeights (or NewPolyRingWithWeights), and now I do think we should, because calling NewPolyRing with a square matrix (say, LexMat(n)) would give GradingDim=n, and I think that is unexpected.

#8 - 14 Mar 2024 10:12 - Anna Maria Bigatti

- Description updated

John Abbott wrote:

[do we require the rows to be in lin indep?]

yes

#9 - 14 Mar 2024 12:04 - Anna Maria Bigatti

- % Done changed from 20 to 60

Added check in the definition of NewPolyRing(K, X, WeightsMat).
Should I rename it NewPolyRingWeights?   (not yet documented, I believe)

#10 - 15 Mar 2024 15:37 - Anna Maria Bigatti

- Description updated

- Status changed from In Progress to Resolved

- % Done changed from 60 to 80

Anna Maria Bigatti wrote:

> Added check in the definition of NewPolyRing(K, X, WeightsMat).
> Should I rename it NewPolyRingWeights?   (not yet documented, I believe)

Yes, I called it **NewPolyRingWeights** to emphasize its meaning.
Also in CoCoA-5.

Document in CoCoALib and CoCoA-5, then close this issue.

#11 - 18 Mar 2024 16:15 - Anna Maria Bigatti

- Status changed from Resolved to Closed

- % Done changed from 80 to 100