CoCoA-5 - Support #1478

HilbertBasis: clarify

06 Aug 2020 16:34 - John Abbott

Status:	Closed	**Start date:**	06 Aug 2020
Priority:	Normal	**Due date:**	
Assignee:	Anna Maria Bigatti	**% Done:**	100%
Category:	Manual/documentation	**Estimated time:**	0.50 hour
Target version:	CoCoA-5.4.0	**Spent time:**	0.50 hour

Description

Andraschko writes...

Solving linear Diophantine systems of equations with Normaliz. According to Prof. Kreuzer, it is possible to compute Hilbert Bases using the Nmz-functions from CoCoA, but I didn't find anything useful yet. E.g. the function NmzHilbertBasis doesn't do anything useful for me - I also have no idea what a "Hilbert-Gordan Basis" is (not even Google does).

Related issues:

Related to CoCoA-5 - Design #1194: Rename HilbertBasisKer into LinKerHilbertB...	**Rejected**	**25 Jun 2018**
Related to CoCoA-5 - Support #225: HilbertBasis: cocoa vs normaliz	**Closed**	**10 Sep 2012**
Related to CoCoA-5 - Feature #1596: Add CoCoA5 function NmzHilbertBasisKer	**Resolved**	**14 May 2021**

History

#1 - 06 Aug 2020 16:34 - John Abbott

- Related to Design #1194: Rename HilbertBasisKer into LinKerHilbertBasis? added

#2 - 06 Aug 2020 16:34 - John Abbott

- Related to Support #225: HilbertBasis: cocoa vs normaliz added

#3 - 08 May 2021 17:14 - Anna Maria Bigatti

It seems that

```
/**/ M:= matrix(ZZ,
        [[3, -1, 1, 0],
                 [-1, 1, 0, 1]]);
/**/ NmzHilbertBasis(M);
matrix(ZZ,
 [[-1, 1, 0, 1],
  [3, -1, 1, 0]])
```

gives the wrong answer (gives the 2 vectors in M). The code in ExternalLibs-Normaliz.C seems right (line 248).
I tried to guess how to call NmzComputation, but our manual in not sufficient to understand how to do it

```
/**/ M:= matrix(ZZ,
        [[3, -1, 1, 0],
                 [-1, 1, 0, 1]]);
/**/ cone := record[Generators := M];

/**/ /**/ NmzComputation(cone, ["HilbertBasis"]);
--> ERROR: Some error in the normaliz input data detected: Unknown type "Generators"!
--> [CoCoALib] NmzComputation
--> /**/ NmzComputation(cone, ["HilbertBasis"]);
-->      ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

investigate, and improve manual for NmzComputation.

#4 - 14 May 2021 16:50 - Anna Maria Bigatti

- Related to Feature #1596: Add CoCoA5 function NmzHilbertBasisKer added

#5 - 14 May 2021 17:03 - Anna Maria Bigatti

Anna Maria Bigatti wrote:

> It seems that
> [...]
> gives the wrong answer (gives the 2 vectors in M). The code in ExternalLibs-Normaliz.C seems right (line 248).
> I tried to guess how to call NmzComputation, but our manual in not sufficient to understand how to do it
> [...]
> investigate, and improve manual for NmzComputation.

That is right. There is now the new function NmzHilbertBasisKer #1596

#6 - 23 Feb 2022 12:28 - John Abbott

- Status changed from New to Closed

- Assignee set to Anna Maria Bigatti

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

- % Done changed from 0 to 100

- Estimated time set to 0.50 h

This has been completely resolved by introducing the new function **NmzHilbertBasisKer** (see issue #1596).
The new fn will soon be added to doc.
Closing.