

## CoCoALib - Design #1750

### IdealOfPoints: allow duplicate points?

03 Jul 2023 16:11 - John Abbott

<b>Status:</b>	In Progress	<b>Start date:</b>	03 Jul 2023
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assignee:</b>	John Abbott	<b>% Done:</b>	20%
<b>Category:</b>	Improving	<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	CoCoALib-0.99880	<b>Spent time:</b>	1.60 hour
<b>Description</b> In a recent email a user (puwu) reported a "bug" in CoCoA. The supplied program wanted to compute <b>IdealOfPoints</b> of a list which was generated automatically, and which contained duplicate points. Currently the code checks for duplicates, and throws an error if any are found. Should duplicate points be allowed? Perhaps a "boolean" option requesting that duplicate points be accepted? Discuss, decide, & implement if nec.			

#### History

##### #1 - 03 Jul 2023 16:12 - John Abbott

If we decide to permit duplicate points, implementation should be conceptually very easy... just tedious.  
And don't forget to update the doc!

##### #2 - 31 Jan 2024 22:16 - John Abbott

Should we implement this? Or postpone it? Or reject it?  
What is most natural?

Is it really a mistake to ask for `IdealOfPoints(R, [[1,0],[1,0]])`?

##### #3 - 01 Feb 2024 10:03 - Anna Maria Bigatti

- Status changed from New to In Progress

- % Done changed from 0 to 10

I'm more inclined to suggest `IdealOfPoints(R, MakeSet(pts))` in the manual, if one wants to allow duplicates. Maybe we could also write it in the error message.

##### #4 - 01 Feb 2024 10:17 - John Abbott

- Assignee set to John Abbott

- % Done changed from 10 to 20

The CoCoA-5 manual already says that the points must be distinct (as a quick reaction to the problem reported by puwu).  
I have just improved the error messages slightly: previously said Duplicate points now says Points must be distinct.

The **source code** is in **SparsePolyOps-ideal-points.C** It is mostly ancient code, originally in C, which needs to be cleaned up considerably!!

##### #5 - 01 Feb 2024 10:42 - John Abbott

MakeSet is OK for CoCoA-5 and **affine points**. In CoCoALib/C++ and/or with projective points it is not so simple.  
Anna pointed out that our functions already effectively make the input distinct when doing the checking, so we could

make that code accessible to the caller.... or offer the possibility for the user to make a call allowing duplicate points.

**#6 - 08 Mar 2024 18:22 - John Abbott**

After on-line discussion... Anna suggests: (either-or)

- **(A)** make 2 fns: one which allows duplicate points, and one which does not
- **(B)** make 2 new fns for users: RemoveDuplicateAffinePoints and RemoveDuplicateProjectivePoints (names need improvement)

**#7 - 08 Mar 2024 18:23 - John Abbott**

- Target version changed from CoCoALib-0.99850 to CoCoALib-0.99880