CoCoALib - Feature #143

Buchberger-Moeller (parent task)

01 May 2012 10:17 - John Abbott

Status:	In Progress	Start date:	01 May 2012		
Priority:	Urgent	Due date:			
Assignee:	John Abbott	% Done:	38%		
Category:	New Function	Estimated time:	0.00 hour		
Target version:	CoCoALib-1.0	Spent time:	18.45 hours		
Description					
Robbiano wants to have Buchberger-Moeller in C5. It makes most sense to implement it in CoCoALib and then make it visible in C5.					
There are several versions to implement: these are in the subtasks.					
Subtasks:					
Feature # 144: Buchberger-Moeller: generic impl					Closed
Feature # 145: Buchberger-Moeller: fast modular impl					New
Feature # 147: Buchberger-Moeller: impl via modular reduction				In Progress	
Related issues:					
Related to CoCoALib - Feature #146: Buchberger-Moeller: input conversions N				01 May 2012	
Related to CoCoALib - Feature #123: IdealOfPoints with generic coeffs			New	04 Apr 2012	

History

#1 - 28 Jan 2013 08:09 - Anna Maria Bigatti

- Category set to New Function

#2 - 08 Feb 2013 18:00 - John Abbott

- Status changed from New to In Progress
- Assignee set to John Abbott
- Target version set to CoCoALib-0.9953

#3 - 08 Apr 2013 12:10 - John Abbott

What output do we want or need from the Buchberger-Moeller implementations?

- 1. generators of the ideal (list of polynomials)
- 2. separators (list of polynomials)
- 3. quotient basis (list of PPs, or perhaps list of polynomials)

The definition of *separator* in the case of projective points is not unique. In C4 we opted for polynomials which evaluate to 1 on the given representatives; should we continue to use this definition in CoCoA-5? Or perhaps there should no way to compute the separators in this case?

Opinions? Comments?

#4 - 08 Apr 2013 12:28 - John Abbott

JAA proposes offering two functions IdealOfPoints (for the affine case) and IdealOfProjectivePoints (for the projective case) which produce ideals.

In CoCoALib (and perhaps also in CoCoA-5) we could offer further functions for computing a complete result (presumably represented as a RECORD). In C4 these had cumbersome names such as IdealAndSeparatorsOfProjectivePoints. JAA proposes simpler names such as BuchbergerMoeller and ProjectiveBuchbergerMoeller. In the result JAA prefers a list of generators rather than an ideal -- it is quite easy for a user to

produce an ideal from a list of generators (or vice versa).

Opinions?

#5 - 08 Apr 2013 20:58 - John Abbott

My old impls in CoCoA-4 returned a matrix as the result: the entries in the matrix are the coeffs of the basis elements and of the separators.

The result also contained a list of PPs so that the appropriate polys could be reconstructed easily.

JAA now thinks that this is probably the most sensible type of value to return (for the internal BM fns that actually do the work).

The conversion from matrix to list of polys is straightforward, and can be effected by some auxiliary fns.

#6 - 29 May 2013 16:51 - John Abbott

- Target version changed from CoCoALib-0.9953 to CoCoALib-0.99534 Seoul14

The stopgap impls will have to suffice for 0.9953/CoCoA School as there's no chance of completing a proper impl in time.

#7 - 29 Oct 2013 15:17 - Anna Maria Bigatti

- Target version changed from CoCoALib-0.99534 Seoul14 to CoCoALib-0.99532

#8 - 03 Apr 2014 11:29 - John Abbott

- Target version changed from CoCoALib-0.99532 to CoCoALib-0.99533 Easter14

#9 - 04 Apr 2014 17:45 - John Abbott

- Target version changed from CoCoALib-0.99533 Easter14 to CoCoALib-0.99534 Seoul14

#10 - 10 Jul 2014 14:16 - John Abbott

- Target version changed from CoCoALib-0.99534 Seoul14 to CoCoALib-1.0