

CoCoALib - Feature #1173

Upper bound for value of poly in an interval

04 Apr 2018 11:49 - John Abbott

Status:	New	Start date:	04 Apr 2018
Priority:	Normal	Due date:	
Assignee:		% Done:	0%
Category:	New Function	Estimated time:	0.00 hour
Target version:	CoCoALib-1.0	Spent time:	1.00 hour
Description			
Write a function which accepts a (univariate) polynomial f (with rational coeffs), and an interval $[a,b]$ with rational end points; the functions returns a rational which is an upper bound for $\max(f(x) \mid x \text{ in } [a,b])$ and perhaps also a lower bound for $\min(f(x) \mid x \text{ in } [a,b])$.			
Related issues:			
Related to CoCoA-5 - Bug #1171: RealRoots: first point is sometimes wrong?		Closed	03 Apr 2018
Related to CoCoALib - Feature #1176: interval arithmetic		In Progress	05 Apr 2018

History

#1 - 04 Apr 2018 11:49 - John Abbott

- Related to Bug #1171: RealRoots: first point is sometimes wrong? added

#2 - 04 Apr 2018 11:52 - John Abbott

A while ago I read an article about this (perhaps "evaluating a polynomial over an interval"?). I no longer recall many details.

The main idea is to repeatedly subdivide the interval (not necessarily evenly), and recurse on the two "halves", then combine the results. The base case uses "Horner's algorithm" for intervals.

JAA believes that this could also be useful/interesting for the SC-Square project.

#3 - 04 Apr 2018 11:55 - John Abbott

- Description updated

#4 - 05 Apr 2018 13:41 - John Abbott

- Related to Feature #1176: interval arithmetic added