# CoCoALib - Feature #856

# MantissaAndExponent2 for twin-float

25 Mar 2016 22:15 - John Abbott

Status:	Closed	Start date:	25 Mar 2016
Priority:	Normal	Due date:	
Assignee:	John Abbott	% Done:	100%
Category:	New Function	Estimated time:	4.01 hours
Target version:	CoCoALib-0.99550 spring 2017	Spent time:	4.10 hours

## Description

So far the only way to get a "proper value" out of a twin-float was to use IsRational, but that works only if the value is a simple rational - it does not work if the twin-float is an approximation to sqrt(2), say.

A MantExp2 structure is a good way of representing a finite precision approximation, so it makes sense to "export" a twin-float into a MantExp2 structure.

Implement!

### History

#### #1 - 25 Mar 2016 22:22 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

Here is a summary description of the ideal behaviour of the "exporting" fn:

let x be a (non-zero) twin-float (zero is trivial to deal with);

let ME2 be the corresponding MantExp2 structure;

let Q be the exact rational corresponding to the exact value of ME2;

let Q\_up and Q\_down be the rationals corresponding the values of MantExp2 structures whose only difference is that the "mantissa" part has been incremented (or decremented) by 1;

then I would like  $@Q_up > x$  to give true, and  $Q_down < x$  to give true.

I'm not sure if it is reasonable to expect Q == x to give true (rather than InsuffPrec); I would certainly hope it does not give false!

### #2 - 25 Mar 2016 22:29 - John Abbott

- Status changed from In Progress to Feedback
- % Done changed from 10 to 90

I have implemented the fn. It seems to work more or less as expected.

Note that the fn does reveal some of what goes on inside twin-float arithmetic, so it is quite likely that the same computation performed twice may give slightly different results when MantissaAndExponent2 is applied.

I do not think that MantissaAndExponent10 makes sense here.

Documented. Exported to CoCoA-5, and documented there too.

## #3 - 16 Sep 2016 16:42 - John Abbott

- Status changed from Feedback to Closed

- % Done changed from 90 to 100

Closing after 6 months in feedback.

## #4 - 28 Apr 2017 09:30 - Anna Maria Bigatti

- Estimated time set to 4.01 h