

CoCoALib - Design #1309

SmoothFactor: allow limit = 1?

10 Sep 2019 11:36 - John Abbott

Status:	Closed	Start date:	10 Sep 2019
Priority:	Normal	Due date:	
Assignee:	John Abbott	% Done:	100%
Category:	Improving	Estimated time:	1.01 hour
Target version:	CoCoALib-0.99650 November 2019	Spent time:	0.90 hour

Description

The SmoothFactor function tries to factorize integers by dividing by all primes up to a specified limit.

Currently that limit must be at least 2, otherwise an error is reported.

Should the limit be lowered to 1?

One motivation: let p be a prime, then one would expect $\text{SmoothFactor}(p, \text{FloorSqrt}(p))$ to return an empty factorization (and the RemainingFactor would be just p). With the current limit of 2 this will not work for the primes 2 and 3 because the FloorSqrt is below 2.

History

#1 - 10 Sep 2019 11:41 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

The original reason for imposing the limit was to help users detect "obviously silly" function calls. Now I think that $\text{SmoothFactor}(n, 1)$ is not always "obviously silly".

I encountered the problem in another program I have written. In this program I wanted to compute something like $\text{SmoothFactor}(n, \text{FloorSqrt}(n))$; just occasionally n can be small, so the program triggers a BadArg error.

Of course, I could change my program so that it detects if n is smaller than 4 and then handles that case specially; but that makes my program more complicated and less readable.

Comments? Opinions?

#2 - 10 Sep 2019 11:58 - John Abbott

There are two separate impls for SmoothFactor (one for MachineInt and one for BigInt). One allowed the limit 1, the other did not.

#3 - 10 Sep 2019 12:26 - John Abbott

I have just changed the code to allow $\text{limit}=1$. All tests and examples pass (which suggests that the tests were not very thorough... oh).

#4 - 09 Oct 2019 20:26 - John Abbott

- Status changed from In Progress to Closed

- Assignee set to John Abbott

- % Done changed from 10 to 100

#5 - 10 Oct 2019 18:45 - Anna Maria Bigatti

- *Target version changed from CoCoALib-0.99700 to CoCoALib-0.99650 November 2019*

- *Estimated time set to 1.01 h*