Continued Fractions in Lean

A Newbie's Adventure

Kevin Kappelmann

June 14, 2019

Vrije Universiteit Amsterdam

Let's Go on an Adventure

















...perhaps because I am interning at VU Amsterdam

■ Some experience using Isabelle

- Some experience using Isabelle
- First project with a dependent type theorem prover

- Some experience using Isabelle
- First project with a dependent type theorem prover
- Basic maths and functional programming knowledge



Bla

A generalized continued fraction is... $% \label{eq:continued} % \l$

A generalized continued fraction is...

$$b + \frac{a_0}{b_0 + \frac{a_1}{b_1 + \frac{a_2}{b_2 + \frac{a_3}{b_3 + \cdots}}}}$$

A generalized continued fraction is...

$$b + \frac{a_0}{b_0 + \frac{a_1}{b_1 + \frac{a_2}{b_2 + \frac{a_3}{b_3 + \ddots}}}}$$

• b is called the integer part

A generalized continued fraction is...

$$b + \frac{a_0}{b_0 + \frac{a_1}{b_1 + \frac{a_2}{b_2 + \frac{a_3}{b_3 + \cdots}}}}$$

- *b* is called the *integer part*
- each a_i is a partial numerator

A generalized continued fraction is...

$$b + \frac{a_0}{b_0 + \frac{a_1}{b_1 + \frac{a_2}{b_2 + \frac{a_3}{b_3 + \cdots}}}}$$

- b is called the integer part
- lacktriangle each a_i is a partial numerator
- each b_i is a partial denominator