

# DSLs of Mathematics: Lecture 1, Introduction

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# ADMINISTRATRIVIA

# Administratrivia

- Exam: 2016-03-16 morning, re-exam: 2016-08-23 afternoon
- Two assignments, groups of three to four students, to be announced

# Administratrivia

## Schedule:

- Lectures Mondays 10-12 (in ED) and Fridays 13-15 (in EB)
- Exercises Wednesdays 13-15 and Thursdays 10-12 (in E-studion)
- Guest lectures in Week 4 (Monday 2016-02-08 and Friday 2016-02-12)

## Course team:

- Examiner: Patrik Jansson
- Assistants: Irene Lobo Valbuena and Victor Lopez Juan
- Intern: Adam Sandberg Eriksson
- Teacher: Cezar Ionescu

# Administratrivia

Course web page:

<https://github.com/DSLsofMath/DSLsofMath/blob/master/Course2016.md>

Many other materials on GitHub.

# QUESTIONS

## Introduction

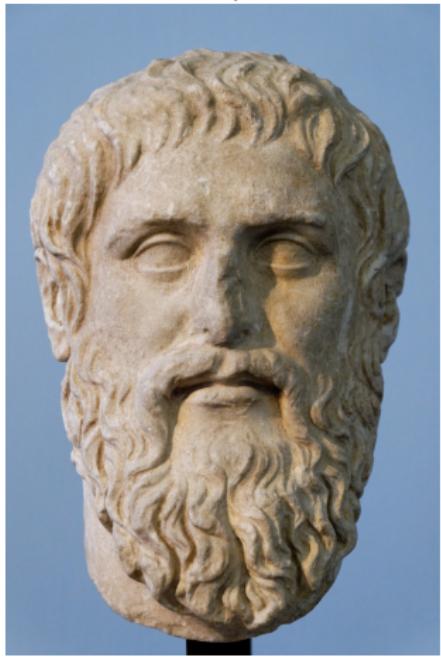
# Why “DSLs” of Mathematics?

One of the leading ideas: mathematics as the study of *ideal languages*.

# Platonism

Ideal languages are about *ideal objects*,  
and these exist!

Plato, cca 450BC



# Formalism

The only ideal languages that mathematics studies are **formal systems**.

*Mathematics is the science of formal systems!*

Haskell Curry (1900–1982)



# Intuitionism

Luitzen Egbertus Jan Brouwer (1881–1966)

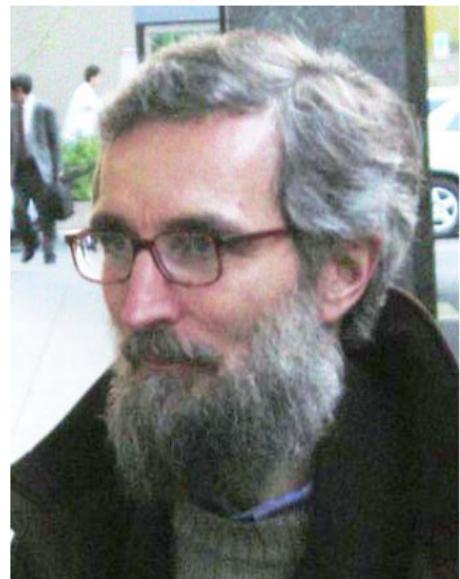
The only ideal languages worth studying are  
those . . . that Brouwer likes!



# Constructivism

Per Martin-Löf (born 1942)

Brouwer likes only programming languages  
(functional and with dependent types)  
...and he was right!



# Chapter 1

## Logic

# Rigour and Logic

A Mathematical proof is rigorous when it is (or could be) written out in the first order predicate language  $\mathcal{L}(\in)$  as a sequence of inferences from the axioms ZFC, each inference made according to one of the stated rules.

For the concept of rigor we make a historical claim : That rigor is absolute and here to stay.

Saunders Mac Lane 1909–2005

