

Course organisation

MPRI 2–6: Abstract Interpretation,
application to verification and static analysis

Antoine Miné

Year 2017–2018

Course 01a

13 September 2017

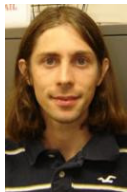
Course plan

- **foundation** of abstract interpretation (2 courses)
 - **fixpoint** program **semantics**
 - **order** and **approximation** theory
 - **hierarchy** of semantics
- **bricks** of static analyzers (5 courses)
 - **numeric** abstract domains
 - **pointer** and **memory shape** abstract domains
 - **partitioning** domains
 - domain **combiners** (reduced products, partitioning)
- domain-specific **static analyses** (9 courses)
 - analysis of **control-command embedded** programs
 - analysis of **concurrent** programs
 - analysis of **program transformation**
 - analysis of **distributed** systems
 - analysis of **mobile** systems
 - analysis of **biological** systems

Teaching team



Cezara Drăgoi



Jérôme Feret



Antoine Miné



Xavier Rival

Visit regularly:

<https://www-apr.lip6.fr/~mine/enseignement/mpri/2017-2018/>

- latest information on course dates
- course material
- course assignments
- M2 **internship proposals**, updated regularly

Exams:

- **written** exam: TBA
- **oral** exam: TBA (read a scientific article, present it, answer questions)

Main material: [slides](#).

[Course notes](#) for the first part of the course

(foundations and numeric domains)

work in progress, sent by email.

Highly recommended reading:

J. Bertrane, P. Cousot, R. Cousot, J. Feret, L. Mauborgne, A. Miné, X. Rival.
Static analysis and verification of aerospace software by abstract interpretation.
In *Foundations and Trends in Programming Languages (FnTPL)*, 2(2–3), 71–190,
2015. Now Publishers.

([link on the webpage](#))

- theoretical background: section 2
- detailed application: section 3

Course assignments

On the web page, **highly recommended homeworks** after each course:

- an **exercise**: proof of theorem, former exam, etc.
- a **reading assignment**: an article related to the course
- an **experiment**: using a tool

Not evaluated by the teacher, gives no credit.
The solution of the exercises is also given.

Goal:

- self-evaluation after each course
- preparation for the exam

Additional material:

- previous exams, with correction
- course bibliography (in the slides; reading is not mandatory)