Course organisation

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

Antoine Miné

year 2016–2017

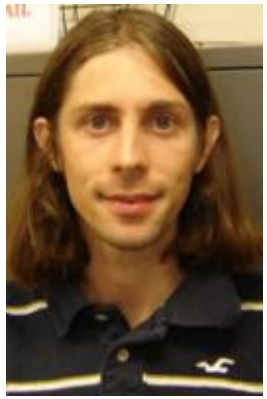
course 01a
14 September 2016

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

Syllabus and exams

Visit regularly:

https://www-apr.lip6.fr/~mine/enseignement/mpri/2016-2017/

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

Exams:

- written exam on 30 November 2016
- oral exam, TBA read a scientific article, present it, answer questions

Course material

Main material: slides.

No reference book on the topic!

But, **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 recommanded** 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)