Proof interoperability

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**Context.** The formal verification of mathematical proofs or critical software is of increasing importance in many applications. In the last decades, many proof assistants have been developed: Coq, Isabelle, HOL, Agda, Lean, nuPRL, Mizar, PVS, etc. And very large libraries of mathematical results have been formalized in each of these systems. For instance, Coq has an important library on group theory, HOL has an important library on analysis, Mizar has an important library on set theory, etc.

Unfortunately, in contrast to what happens in programming languages, it is very difficult to use theorems from one system to the other. However, some important progress has been recently made, thanks to the use of some logical framework, the λΠ-calculus modulo rewriting implemented in Dedukti [1], and some reverse mathematics techniques. Indeed, Deducteam developed tools able to translate proofs from Matita (a proof assistant similar to Coq) or OpenTheory (a proof format for HOL) to Coq, Lean, HOL, PVS or Matita, by using intermediate representations in Dedukti.

**Goal.** The goal of this postdoc is to translate large libraries of proofs from Mizar, PVS or Isabelle to Dedukti so that, in turn, they can be exported to other systems like Coq, Lean, HOL, Matita, etc.

**Workplan.**

- A first step is to define in Dedukti the logics underlying the chosen proof system. Some previous work has been done on PVS [2] and on Isabelle (see here).
- Then, one needs to develop a tool translating proofs from the chosen system to Dedukti, efficient enough to handle large libraries.

**Requirements.** Good knowledge of Isabelle, PVS or Mizar
References
