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CONFident at CoCo 2022

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- CONFident is a tool for checking **(non-)confluence** of systems based on rewriting by means of its logical representation.
- CONFident can deal with:
 - Term Rewriting Systems.
 - Conditional Term Rewriting Systems (oriented, join and semi-equational).
 - **Context-Sensitive** Term Rewriting Systems. **NEW!**
 - **Conditional Context-Sensitive** Term Rewriting Systems. **NEW!**

Implementation

- The tool is available here:
`http://zenon.dsic.upv.es/confident/`
- It is written in Haskell and its based on a divide-and-conquer scheme where different techniques are recursively applied using a pre-defined strategy. [GVL22]
- Different techniques are defined based on the logical representation of the systems to check **(non-)joinability** of (conditional) critical pairs [GLV21,LVG22]:
 - Proving **conditional joinability** as a logical consequence using Theorem Provers.
 - Disproving **conditional joinability** as a feasibility problem using infChecker. [GL20]

Our **proof strategy** is:

- 1 We apply unification and narrowing so simplify conditional rules and pairs. We also use modularity results;
- 2 We compute the set of extended conditional critical pairs [Luc22];
- 3 We analyze the system to extract good properties. External tools like MU-TERM can be used to check *operational termination* or *termination* of CTRSs. Prover9 is used to check joinability of conditional pairs. infChecker is used to check infeasibility of rules and conditional pairs;
- 4 We apply graph-based or feasibility techniques to prove or disprove joinability of the extended conditional critical pairs.

Bibliography

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