CoCo 2024 Participant: CeTA 3.2

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CeTA 3.2

- CeTA: certifier of various properties, verified in Isabelle/HOL
- mostly developed by Computational Logic Group in Innsbruck
- several confluence techniques supported, see a complete list at:

  http://cl-informatik.uibk.ac.at/software/ceta/

- usage in CoCo: certify proofs and disproofs of
  - confluence
  - commutation
  - infeasibility (new in 2024: feasibility)
- usage in ARI-database: certify YES/NO for CR/COM/INF-tags

New techniques in CeTA 3.2 in comparison to 2023

- several new term orders for non-CR/COM and infeasibility proofs
  - CoWPO and WPO (weighted path order)
  - generalized WPO and MSPO (monotonic semantic path order)
  - polynomial interpretations over $\mathbb{Z}_{\leqslant 0}$
- non-joinability proofs via finite sets of reachable terms
- feasibility proofs via explicit conditional rewrite sequences (no certificate generating tool yet)
- infeasibility proofs by unraveling and Knuth–Bendix completion (used by Moca)

New CPF 3 format in 2024

- converter from CPF 2 available (based on xsltproc)
- more consistent confluence proofs, e.g., same format for joining sequences
- better support for competitions, e.g., overwrite input and answer in CPF3
- more concise certificates
    - rule- and term-indexing
    - removed superfluous XML-elements

```
<polynomial><sum>
  <polynomial><variable>1</variable></polynomial>
  <polynomial><coefficient><integer>2</integer></coefficient></polynomial>
</sum></polynomial>
```

to specify $x_1 + 2$ in CPF 2 becomes the following in CPF 3:

```
<sum><variable>1</variable><integer>2</integer></sum>
```