

Exercises for “Decision Procedures for Verification” Exercise sheet 8.1

Exercise 8.1: (2 P)

Let ϕ be the following (ground) formula:

$$f(f(c)) \approx f(c) \wedge f(f(c)) \approx f(d) \wedge d \not\approx f(c).$$

- (1) Compute $FLAT(\phi)$ (the formula obtained by recursively replacing, in a bottom-up fashion, any term of the form $f(c')$, where c' is a constant, with a new constant).
- (2) Compute $FC(\phi)$ (the set of functional consistency axioms associated with the flattening above):

$$FC(\phi) = \{c_1 \approx c_2 \rightarrow d_1 \approx d_2 \mid d_i \text{ is introduced as an abbreviation for } f(c_i)\}.$$

- (3) Check whether $FLAT(\phi) \wedge FC(\phi)$ is satisfiable.
- (4) Is ϕ is satisfiable? Justify your answer.

Please submit your solution until Wednesday, January 15, 2014 at 13:00. Joint solutions prepared by up to three persons are allowed. Please do not forget to write your name on your solution.

Submission possibilities:

- By e-mail to sofronie@uni-koblenz.de with the keyword “Homework DP” in the subject.
- Put it in the box in front of Room B 222.