Bromberger/Möhle/Schwarz/Weidenbach   **December 01, 2022**

Tutorials for "Automated Reasoning WS22/23"
Exercise sheet 6

Exercise 6.1:
Consider the theory of linear rational arithmetic and the clauses $3x_1 + 4x_2 - 1 > 0$, $-x_1 + x_2 + 1 \geq 0$, $2x_2 - x_3 \approx 0$, $x_3 - x_1 < -2 \vee x_2 > 1$ and check via CDCL(LRA) whether this clause set is satisfiable.

Exercise 6.2:
Check whether the following clause set is satisfiable via CDCL(LRA).

$$N = \{y < 5 + x \vee y > 5 + x,\ x \approx z - 3,\ y \leq 3x + 2 - z,\ y - 11 + 3x \geq 2z,\ y - z > 4\}$$

Exercise 6.3:
Compute an mgu for the following unification problems using both $\Rightarrow_{SU}$ and $\Rightarrow_{PU}$ where x, y, z and their primed versions are all variables and there is only one sort:

1. $\{f(x, h(x, y)) = f(f(y, z), h(y, z'))\}$

2. $\{h(x, y) = z, g(f(x, x)) = z', g(g(f(a, y))) = g(z')\}$

3. $\{h(x, y) = h(x', y'), y' = f(x, a), f(g(a), z) = y\}$

Exercise* 6.4:
Prove that $\Rightarrow_{PU}$ terminates.

It is not encouraged to prepare joint solutions, because we do not support joint exams.