2. Satisfiability of Comparisons

We consider conjunctions of comparisons, that is, atoms with the predicates "=", "≠", "≤", and "<" (also called built-in predicates) and we are interested in finding out how difficult it is to decide whether such a conjunction is satisfiable.

Of course, for conjunctions containing the predicates "≤" and "<" we have to specify the ordered type over which those comparisons range. We will distinguish the two cases of rational numbers and integers.

For each of the following classes of conjunctions of comparisons, describe a method by which one can check satisfiability: Comparisons with

1. "="

2. "=" and "≠"

3. "≤", ranging over the rational numbers

4. "≤", ranging over the integers

5. "≤" and "≠", ranging over the rational numbers

6. "≤" and "<", ranging over the rational numbers

7. "≤" and "<", ranging over the integers.