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**Tutorials for "Automated Reasoning WS18/19"
Exercise sheet 13**

Exercise 13.1 (6.12):
Use the Simplex calculus to check satisfiability of the below equations.

$$
\begin{aligned}
2x + 5y &\leq -17 \\
3x + 7y &\leq -24 \\
2x + 5y &\geq -17 \\
3x + 7y &\geq -24
\end{aligned}
$$

Exercise 13.2 (6.13):
Consider the equations

$$
\begin{aligned}
x &\geq 0 \\
y &\geq 0 \\
z &\geq 0 \\
2x + y + z &\leq 14 \\
4x + 2y + 3z &\leq 28 \\
2x + 5y + 5z &\leq 30
\end{aligned}
$$

which are obviously satisfied by an assignemnt mapping all variables to 0. Now check satisfiability of the above equations by adding

1. $x + 2y - z \geq 10$ and

2. $x + 2y - z \geq 14$

respectively. For both separate cases, apply the Simplex calculus.

Exercise* 13.3 (6.14):
Provide an example where the simplex algorithm does not terminate, if FailBounds is not preferred over EstablishBounds.

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