

Termination, exercises

M2IF – Automated deduction

DP

Arts & Giesl

$$x - 0 \rightarrow x$$

$$s(x) - s(y) \rightarrow x - y$$

$$0 \div s(y) \rightarrow 0$$

$$s(x) \div s(y) \rightarrow s((x - y) \div s(y))$$

$$0 \leq y \rightarrow \text{true}$$

$$s(x) \leq 0 \rightarrow \text{false}$$

$$s(x) \leq s(y) \rightarrow x \leq y$$

$$0 - y \rightarrow 0$$

$$s(x) - y \rightarrow \text{ifte}(s(x) \leq y, s(x), y)$$

$$\text{ifte}(\text{true}, s(x), y) \rightarrow 0$$

$$\text{ifte}(\text{false}, s(x), y) \rightarrow s(x - y)$$

$$0 \div s(y) \rightarrow 0$$

$$s(x) \div s(y) \rightarrow s((x - y) \div s(y))$$

$$\text{half}(0) \rightarrow 0$$

$$\text{half}(s(s(x))) \rightarrow s(\text{half}(x))$$

$$\text{log}(s(0)) \rightarrow 0$$

$$\text{log}(s(s(x))) \rightarrow s(\text{log}(s(\text{half}(x))))$$

$$\text{concat}(\text{cons}(u, v), y) \rightarrow \text{cons}(u, \text{concat}(v, y))$$
$$\text{Fewer}\perp(x, \perp) \rightarrow \text{false}$$
$$\text{Fewer}\perp(\perp, \text{cons}(w, z)) \rightarrow \text{true}$$
$$\text{Fewer}\perp(\text{cons}(u, v), \text{cons}(w, z)) \rightarrow \text{Fewer}\perp(\text{concat}(u, v), \text{concat}(w, z))$$

DP

Arts & Giesl

$$\begin{aligned}0 + y &\rightarrow y \\s(x) + 0 &\rightarrow s(x) \\s(x) + s(y) &\rightarrow s(s(x) + (y + 0))\end{aligned}$$

$$x \times (y + 1) \rightarrow (x \times (y + (1 \times 0))) + x$$

$$x \times 1 \rightarrow x$$

$$x + 0 \rightarrow x$$

$$x \times 0 \rightarrow 0$$

DP

Walther

$$\begin{aligned}f(0) &\rightarrow s(0) \\f(s(0)) &\rightarrow s(0) \\f(s(s(x))) &\rightarrow f(f(s(x)))\end{aligned}$$