

Contents

1	exType Theory	3
1.1	Definitions	3
1.2	Theorems	3
2	nexp Theory	3
2.1	Datatypes	3
2.2	Definitions	3
2.3	Theorems	4

1 exType Theory

Built: 15 February 2020

Parent Theories: indexedLists, patternMatches

1.1 Definitions

[APP_def]

$$\vdash (\forall l. \text{APP } [] \ l = l) \wedge \forall h \ l_1 \ l_2. \text{APP } (h::l_1) \ l_2 = h::\text{APP } l_1 \ l_2$$

[Map_def]

$$\vdash (\forall f. \text{Map } f \ [] = []) \wedge \forall f \ h \ l_1. \text{Map } f \ (h::l_1) = f \ h::\text{Map } f \ l_1$$

1.2 Theorems

[APP_ASSOC]

$$\vdash \forall l_1 \ l_2 \ l_3. \text{APP } (\text{APP } l_1 \ l_2) \ l_3 = \text{APP } l_1 \ (\text{APP } l_2 \ l_3)$$

[LENGTH_APP]

$$\vdash \forall l_1 \ l_2. \text{LENGTH } (\text{APP } l_1 \ l_2) = \text{LENGTH } l_1 + \text{LENGTH } l_2$$

[Map_APP]

$$\vdash \text{Map } f \ (\text{APP } l_1 \ l_2) = \text{APP } (\text{Map } f \ l_1) \ (\text{Map } f \ l_2)$$

2 nexp Theory

Built: 15 February 2020

Parent Theories: indexedLists, patternMatches

2.1 Datatypes

$$\text{nexp} = \text{Num num} \mid \text{Add nexp nexp} \mid \text{Sub nexp nexp} \mid \text{Mult nexp nexp}$$

2.2 Definitions

[nexpVal_def]

$$\begin{aligned} \vdash & (\forall num. \text{nexpVal } (\text{Num } num) = num) \wedge \\ & (\forall n_1 \ n_2. \text{nexpVal } (\text{Add } n_1 \ n_2) = \text{nexpVal } n_1 + \text{nexpVal } n_2) \wedge \\ & (\forall n_1 \ n_2. \text{nexpVal } (\text{Sub } n_1 \ n_2) = \text{nexpVal } n_1 - \text{nexpVal } n_2) \wedge \\ & \forall n_1 \ n_2. \text{nexpVal } (\text{Mult } n_1 \ n_2) = \text{nexpVal } n_1 \times \text{nexpVal } n_2 \end{aligned}$$

2.3 Theorems

[Add_0]

$\vdash \forall n. \text{nexpVal } (\text{Add } (\text{Num } 0) \ n) = \text{nexpVal } n$

[Add_SYM]

$\vdash \forall n_1 \ n_2. \text{nexpVal } (\text{Add } n_1 \ n_2) = \text{nexpVal } (\text{Add } n_2 \ n_1)$

[Mult_ASSOC]

$\vdash \forall n_1 \ n_2 \ n_3.$
 $\text{nexpVal } (\text{Mult } n_1 \ (\text{Mult } n_2 \ n_3)) =$
 $\text{nexpVal } (\text{Mult } (\text{Mult } n_1 \ n_2) \ n_3)$

[Sub_0]

$\vdash \forall n.$
 $(\text{nexpVal } (\text{Sub } (\text{Num } 0) \ n) = 0) \wedge$
 $(\text{nexpVal } (\text{Sub } n \ (\text{Num } 0)) = \text{nexpVal } n)$

Index

exType Theory, 3

Definitions, 3

APP_def, 3

Map_def, 3

Theorems, 3

APP_ASSOC, 3

LENGTH_APP, 3

Map_APP, 3

nexp Theory, 3

Datatypes, 3

Definitions, 3

nexpVal_def, 3

Theorems, 4

Add_0, 4

Add_SYM, 4

Mult_ASSOC, 4

Sub_0, 4