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1 nexp Theory

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Parent Theories: indexedLists, patternMatches

1.1 Datatypes

nexp = Num num | Add nexp nexp | Sub nexp nexp | Mult nexp nexp

1.2 Definitions

[nexpVal_def]

$$\begin{aligned} \vdash & (\forall \text{num}. \text{nexpVal } (\text{Num } \text{num}) = \text{num}) \wedge \\ & (\forall f_1 f_2. \text{nexpVal } (\text{Add } f_1 f_2) = \text{nexpVal } f_1 + \text{nexpVal } f_2) \wedge \\ & (\forall f_1 f_2. \text{nexpVal } (\text{Sub } f_1 f_2) = \text{nexpVal } f_1 - \text{nexpVal } f_2) \wedge \\ & \forall f_1 f_2. \text{nexpVal } (\text{Mult } f_1 f_2) = \text{nexpVal } f_1 \times \text{nexpVal } f_2 \end{aligned}$$

1.3 Theorems

[Add_0]

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

[Add_SYM]

$$\vdash \forall f_1 f_2. \text{nexpVal } (\text{Add } f_1 f_2) = \text{nexpVal } (\text{Add } f_2 f_1)$$

[Mult_ASSOC]

$$\begin{aligned} \vdash & \forall f_1 f_2 f_3. \\ & \text{nexpVal } (\text{Mult } f_1 (\text{Mult } f_2 f_3)) = \\ & \text{nexpVal } (\text{Mult } (\text{Mult } f_1 f_2) f_3) \end{aligned}$$

[Sub_0]

$$\begin{aligned} \vdash & \forall f. \\ & (\text{nexpVal } (\text{Sub } (\text{Num } 0) f) = 0) \wedge \\ & (\text{nexpVal } (\text{Sub } f (\text{Num } 0)) = \text{nexpVal } f) \end{aligned}$$

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