

## t10\_groeb\_2

(TMJ4JtmLSqAUMNcTVAF4ybyqP11EX7KC73T4)

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Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v4\_valued\_0 : \iota \Rightarrow o$  be given. Let  $v2\_pre\_poly : \iota \Rightarrow o$  be given. Let  $r3\_pre\_poly : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_groeb\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r6\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge ((v1\_partfun1 X1 X0) \wedge ((v4\_valued\_0 X1) \wedge (v2\_pre\_poly \\ & X1)))))) \Rightarrow (\forall X2. ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge \\ & (v1\_funct\_1 X2) \wedge ((v1\_partfun1 X2 X0) \wedge ((v4\_valued\_0 X2) \wedge (v2\_pre\_poly \\ & X2)))))) \Rightarrow (\forall X3. ((v1\_relat\_1 X3) \wedge ((v4\_relat\_1 X3 X0) \wedge \\ & (v1\_funct\_1 X3) \wedge ((v1\_partfun1 X3 X0) \wedge ((v4\_valued\_0 X3) \wedge (v2\_pre\_poly \\ & X3)))))) \Rightarrow ((r3\_pre\_poly X0 (k2\_groeb\_2 X0 X2 X1) (k2\_groeb\_2 X0 \\ & X2 X3)) \Rightarrow (r3\_pre\_poly X0 (k2\_groeb\_2 X0 X1 X3) (k2\_groeb\_2 X0 X2 X3)))) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge ((v1\_partfun1 X1 X0) \wedge ((v4\_valued\_0 X1) \wedge (v2\_pre\_poly \\ & X1)))))) \Rightarrow (\forall X2. ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge \\ & (v1\_funct\_1 X2) \wedge ((v1\_partfun1 X2 X0) \wedge ((v4\_valued\_0 X2) \wedge (v2\_pre\_poly \\ & X2)))))) \Rightarrow ((r3\_pre\_poly X0 X2 X1) \Leftrightarrow (r6\_pboole X0 (k2\_groeb\_2 X0 \\ & X1 X2) X1)) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\ & (v1\_funct\_1 X1) \wedge ((v1\_partfun1 X1 X0) \wedge ((v4\_valued\_0 X1) \wedge (v2\_pre\_poly \\ & X1)))))) \Rightarrow (\forall X2. ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge \\ & (v1\_funct\_1 X2) \wedge ((v1\_partfun1 X2 X0) \wedge ((v4\_valued\_0 X2) \wedge (v2\_pre\_poly \\ & X2)))))) \Rightarrow ((r3\_pre\_poly X0 X1 (k2\_groeb\_2 X0 X1 X2)) \wedge (r3\_pre\_poly \\ & X0 X2 (k2\_groeb\_2 X0 X1 X2))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1\_relat\_1 X1)\wedge((v4\_relat\_1 \\ & X1 X0)\wedge((v1\_funct\_1 X1)\wedge(v1\_partfun1 X1 X0))))\wedge((v1\_relat\_1 \\ & X2)\wedge((v4\_relat\_1 X2 X0)\wedge((v1\_funct\_1 X2)\wedge(v1\_partfun1 X2 X0))))\Rightarrow \\ & ((r6\_pboole X0 X1 X2)\Leftrightarrow(X1 = X2)) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1\_relat\_1 X1)\wedge((v4\_relat\_1 \\ & X1 X0)\wedge((v1\_funct\_1 X1)\wedge((v1\_partfun1 X1 X0)\wedge((v4\_valued\_0 X1)\wedge \\ & (v2\_pre\_poly X1))))))\wedge((v1\_relat\_1 X2)\wedge((v4\_relat\_1 X2 X0)\wedge \\ & ((v1\_funct\_1 X2)\wedge((v1\_partfun1 X2 X0)\wedge((v4\_valued\_0 X2)\wedge(v2\_pre\_poly \\ & X2))))))\Rightarrow((v1\_relat\_1 (k2\_groeb\_2 X0 X1 X2))\wedge((v4\_relat\_1 ( \\ & k2\_groeb\_2 X0 X1 X2) X0)\wedge((v1\_funct\_1 (k2\_groeb\_2 X0 X1 X2))\wedge(( \\ & v1\_partfun1 (k2\_groeb\_2 X0 X1 X2) X0)\wedge((v4\_valued\_0 (k2\_groeb\_2 \\ & X0 X1 X2))\wedge(v2\_pre\_poly (k2\_groeb\_2 X0 X1 X2)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.(((v1\_relat\_1 X1)\wedge((v4\_relat\_1 \\ & X1 X0)\wedge((v1\_funct\_1 X1)\wedge((v1\_partfun1 X1 X0)\wedge((v4\_valued\_0 X1)\wedge \\ & (v2\_pre\_poly X1))))))\wedge((v1\_relat\_1 X2)\wedge((v4\_relat\_1 X2 X0)\wedge \\ & ((v1\_funct\_1 X2)\wedge((v1\_partfun1 X2 X0)\wedge((v4\_valued\_0 X2)\wedge(v2\_pre\_poly \\ & X2))))))\Rightarrow(k2\_groeb\_2 X0 X1 X2 = k2\_groeb\_2 X0 X2 X1) \end{aligned} \quad (6)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.\forall X1.((v1\_relat\_1 X1)\wedge((v4\_relat\_1 X1 X0)\wedge( \\ & (v1\_funct\_1 X1)\wedge((v1\_partfun1 X1 X0)\wedge((v4\_valued\_0 X1)\wedge(v2\_pre\_poly \\ & X1))))))\Rightarrow(\forall X2.((v1\_relat\_1 X2)\wedge((v4\_relat\_1 X2 X0)\wedge( \\ & (v1\_funct\_1 X2)\wedge((v1\_partfun1 X2 X0)\wedge((v4\_valued\_0 X2)\wedge(v2\_pre\_poly \\ & X2))))))\Rightarrow(\forall X3.((v1\_relat\_1 X3)\wedge((v4\_relat\_1 X3 X0)\wedge( \\ & (v1\_funct\_1 X3)\wedge((v1\_partfun1 X3 X0)\wedge((v4\_valued\_0 X3)\wedge(v2\_pre\_poly \\ & X3))))))\Rightarrow((r3\_pre\_poly X0 (k2\_groeb\_2 X0 X1 X3) (k2\_groeb\_2 X0 \\ & X2 X3))\Rightarrow(r3\_pre\_poly X0 X1 (k2\_groeb\_2 X0 X2 X3)))) \end{aligned}$$