

## t26\_bilinear

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l2\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $l1\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_zfmisc\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $v2\_bilinear : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_binop\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_algstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l1\_struct\_0 : \iota \Rightarrow o$  be given. Let  $k1\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k8\_bilinear : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_tarski : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_relset\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_funct\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_algstr\_0 : \iota \Rightarrow o$  be given. Let  $v13\_vectsp\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_struct\_0 X0)) \Rightarrow (\forall X1. \\
 & ((\neg v2\_struct\_0 X1) \wedge (l1\_vectsp\_1 X1 X0)) \Rightarrow (\forall X2.((\neg v2\_struct\_0 \\
 & X2) \wedge (l1\_vectsp\_1 X2 X0)) \Rightarrow (\forall X3.((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 \\
 & X3 (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 \\
 & X0)) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 \\
 & (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 X0)))))) \Rightarrow (\forall X4. \\
 & (m1\_subset\_1 X4 (u1\_struct\_0 X2)) \Rightarrow ((k1\_relset\_1 (u1\_struct\_0 \\
 & X1) (k8\_bilinear X0 X1 X2 X3 X4) = u1\_struct\_0 X1) \wedge ((r1\_tarski (k2\_relset\_1 \\
 & (u1\_struct\_0 X0) (k8\_bilinear X0 X1 X2 X3 X4)) (u1\_struct\_0 X0)) \wedge \\
 & (\forall X5.(m1\_subset\_1 X5 (u1\_struct\_0 X1)) \Rightarrow (k3\_funct\_2 (u1\_struct\_0 \\
 & X1) (u1\_struct\_0 X0) (k8\_bilinear X0 X1 X2 X3 X4) X5 = k2\_binop\_1 ( \\
 & u1\_struct\_0 X1) (u1\_struct\_0 X2) (u1\_struct\_0 X0) X3 X5 X4))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\forall X0.(l2\_struct\_0 X0) \Rightarrow (l1\_struct\_0 X0) \tag{2}$$

Assume the following.

$$\forall X0.(l2\_algstr\_0 X0) \Rightarrow ((l2\_struct\_0 X0) \wedge (l1\_algstr\_0 X0)) \tag{3}$$

Assume the following.

$$\forall X0.(l1\_struct\_0 X0) \Rightarrow (\forall X1.(l1\_vectsp\_1 X1 X0) \Rightarrow (l2\_algstr\_0 X1)) \quad (4)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.\forall X4.(((\neg v2\_struct\_0 \\ & X0) \wedge (l1\_struct\_0 X0)) \wedge (((\neg v2\_struct\_0 X1) \wedge (l1\_vectsp\_1 X1 X0)) \wedge \\ & (((\neg v2\_struct\_0 X2) \wedge (l1\_vectsp\_1 X2 X0)) \wedge (((v1\_funct\_1 X3) \wedge \\ & ((v1\_funct\_2 X3 (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) \\ & (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 \\ & X0)))))) \wedge (m1\_subset\_1 X4 (u1\_struct\_0 X2)))))) \Rightarrow ((v1\_funct\_1 \\ & (k8\_bilinear X0 X1 X2 X3 X4)) \wedge ((v1\_funct\_2 (k8\_bilinear X0 X1 X2 \\ & X3 X4) (u1\_struct\_0 X1) (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 (k8\_bilinear \\ & X0 X1 X2 X3 X4) (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 \\ & X0)))))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.\forall X1.\forall X2.(((l1\_algstr\_0 X0) \wedge ((m1\_subset\_1 X1 (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X2 (u1\_struct\_0 X0)))) \Rightarrow (m1\_subset\_1 (k1\_algstr\_0 X0 X1 X2) (u1\_struct\_0 X0))) \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_algstr\_0 X0)) \Rightarrow (\forall X1. \\ & ((\neg v2\_struct\_0 X1) \wedge (l1\_algstr\_0 X1)) \Rightarrow (\forall X2.((v1\_funct\_1 \\ & X2) \wedge ((v1\_funct\_2 X2 (u1\_struct\_0 X0) (u1\_struct\_0 X1)) \wedge (m1\_subset\_1 \\ & X2 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (u1\_struct\_0 X0) (u1\_struct\_0 X1)))))) \Rightarrow \\ & ((v13\_vectsp\_1 X2 X0 X1) \Leftrightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X0)) \Rightarrow (k3\_funct\_2 \\ & (u1\_struct\_0 X0) (u1\_struct\_0 X1) X2 (k1\_algstr\_0 X0 X3 X4) = k1\_algstr\_0 \\ & X1 (k3\_funct\_2 (u1\_struct\_0 X0) (u1\_struct\_0 X1) X2 X3) (k3\_funct\_2 \\ & (u1\_struct\_0 X0) (u1\_struct\_0 X1) X2 X4)))))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge (l2\_algstr\_0 X0)) \Rightarrow (\forall X1. \\ & ((\neg v2\_struct\_0 X1) \wedge (l1\_vectsp\_1 X1 X0)) \Rightarrow (\forall X2.((\neg v2\_struct\_0 \\ & X2) \wedge (l1\_vectsp\_1 X2 X0)) \Rightarrow (\forall X3.((v1\_funct\_1 X3) \wedge ((v1\_funct\_2 \\ & X3 (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 \\ & X0)) \wedge (m1\_subset\_1 X3 (k1\_zfmisc\_1 (k2\_zfmisc\_1 (k2\_zfmisc\_1 \\ & (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 X0)))))) \Rightarrow ((v2\_bilinear \\ & X3 X0 X1 X2) \Leftrightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X2)) \Rightarrow (v13\_vectsp\_1 \\ & (k8\_bilinear X0 X1 X2 X3 X4) X1 X0)))))) \end{aligned} \quad (8)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge (l2\_algstr\_0 X0)) \Rightarrow (\forall X1. \\ & ((\neg v2\_struct\_0 X1) \wedge (l1\_vectsp\_1 X1 X0)) \Rightarrow (\forall X2.((\neg v2\_struct\_0 \\ & X2) \wedge (l1\_vectsp\_1 X2 X0)) \Rightarrow (\forall X3.(m1\_subset\_1 X3 (u1\_struct\_0 \\ & X1)) \Rightarrow (\forall X4.(m1\_subset\_1 X4 (u1\_struct\_0 X1)) \Rightarrow (\forall X5. \\ & (m1\_subset\_1 X5 (u1\_struct\_0 X2)) \Rightarrow (\forall X6.((v1\_funct\_1 X6) \wedge \\ & ((v1\_funct\_2 X6 (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) \\ & (u1\_struct\_0 X0)) \wedge (m1\_subset\_1 X6 (k1\_zfmisc\_1 (k2\_zfmisc\_1 \\ & (k2\_zfmisc\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2)) (u1\_struct\_0 \\ & X0)))))) \Rightarrow ((v2\_bilinear X6 X0 X1 X2) \Rightarrow (k2\_binop\_1 (u1\_struct\_0 \\ & X1) (u1\_struct\_0 X2) (u1\_struct\_0 X0) X6 (k1\_algstr\_0 X1 X3 X4) X5 = \\ & k1\_algstr\_0 X0 (k2\_binop\_1 (u1\_struct\_0 X1) (u1\_struct\_0 X2) ( \\ & u1\_struct\_0 X0) X6 X3 X5) (k2\_binop\_1 (u1\_struct\_0 X1) (u1\_struct\_0 \\ & X2) (u1\_struct\_0 X0) X6 X4 X5)))))))))) \end{aligned}$$