

Multiplication by zero

A. U. Thor

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1 Theorem

We now state Lemma 3.2l of [1]:

PA lemma 3.2l: $\forall x: 0 \cdot x = 0$ \square

2 Proof

PA proof of 3.2l:

L01: S7 \gg	$0 \cdot 0 = 0$;
L02: Block \gg	Begin	;
L03: Hypothesis \gg	$0 \cdot x = 0$;
L04: S8 \gg	$0 \cdot x' = 0 \cdot x + 0$;
L05: S5 \gg	$0 \cdot x + 0 = 0 \cdot x$;
L06: 3.2c \triangleq L04 \triangleq L05 \gg	$0 \cdot x' = 0 \cdot x$;
L07: 3.2c \triangleq L06 \triangleq L03 \gg	$0 \cdot x' = 0$;
L08: Block \gg	End	;
L09: Induction @ $x \triangleright$ L01 \triangleright L08 \gg	$0 \cdot x = 0$;
L10: Gen1 \triangleright L09 \gg	$\forall x: 0 \cdot x = 0$	\square

References

- [1] E. Mendelson. *Introduction to Mathematical Logic*. Wadsworth and Brooks, 3. edition, 1987.