JOURNAL OF FORMALIZED MATHEMATICS
Volume 2, Released 1990, Published 2003
Inst. of Computer Science, Univ. of Białystok

Linear Combinations in Left Module over Associative Ring[1]

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Summary. Notion of linear combination of vectors in Left Module over Associative Ring, defined as function from the carrier of Left Module over Associative Ring to the carrier of this Ring. The following operations are included: addition, subtraction of combinations and multiplication of a combination by a scalar of the Ring. Following it, the sum of a finite set of vectors and the sum of linear combination is defined. Many theorems are proved. This article originated as a generalization of the article [8].

MML Identifier: LMOD_4.

WWW: http://mizar.org/JFM/Vol2/lmod_4.html

The articles [6], [1], [10], [2], [3], [7], [4], [5], [9], and [8] provide the notation and terminology for this paper.

In this paper R is a ring and V is a left module over R.

Let us consider R and let us consider V. We introduce submodule of V as a synonym of subspace of V.

In the sequel R denotes an integral domain, V denotes a left module over R, L denotes a linear combination of V, and a denotes a scalar of R.

We now state two propositions:

(59)[1] If $a \neq 0_R$, then the support of $a \cdot L =$ the support of L.

(78)[2] $\sum(a \cdot L) = a \cdot \sum L$.

REFERENCES

[1] Grzegorz Bancerek and Krzysztof Hryniewiecki. Segments of natural numbers and finite sequences. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/finseq_1.html.

[2] Czesław Byliński. Functions and their basic properties. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/funct_1.html.

[3] Czesław Byliński. Functions from a set to a set. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/funct_2.html.

[4] Eugeniusz Kusak, Wojciech Leończuk, and Michał Muzalewski. Abelian groups, fields and vector spaces. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/vectsp_1.html.

[5] Michał Muzalewski. Construction of rings and left-, right-, and bi-modules over a ring. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/vectsp_2.html.

[1] Supported by RPBP.III-24.C6.

[1] The propositions (1)–(58) have been removed.

[2] The propositions (60)–(77) have been removed.

[6] Andrzej Trybulec. Tarski Grothendieck set theory. *Journal of Formalized Mathematics*, Axiomatics, 1989. http://mizar.org/JFM/Axiomatics/tarski.html.

[7] Wojciech A. Trybulec. Vectors in real linear space. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/rlvect_1.html.

[8] Wojciech A. Trybulec. Linear combinations in vector space. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/vectsp_6.html.

[9] Wojciech A. Trybulec. Subspaces and cosets of subspaces in vector space. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/vectsp_4.html.

[10] Edmund Woronowicz. Relations and their basic properties. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/relat_1.html.

Received October 22, 1990

Published October 7, 2003