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$L = Q(\sqrt{3})$ MAYDON USTIDA IKKINCHI SKALYAR KO‘PAYTMANING TA’RIFI VA XOSSALARI

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Annotatsiya: *Maqolada* L *maydon ustida ikkinchi ushbu* $\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *shakldagi bichiziqli forma olinib,* $\{L,\langle x,y\rangle_2\}$ *bichiziqli metrik fazoning geometriyasi o‘rganildi.* ***Q*** *ratsional sonlar maydoni ustida* $a+b\sqrt{3}, a,b \in Q$ *shakldagi sonlardan iborat bo‘lgan* $L = Q(\sqrt{3}) = \{a+b\sqrt{3}, a,b \in Q\}$ *ikki o‘lchovli maydon va*$\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *shakldagi bichiziqli forma ishlatildi.*

Kalit so‘zlar: *maydon, skalyar ko‘paytma, ratsional son, bichiziqli forma, kommutativ.*

Аннотация: *В* L *статье изучалась* $\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *геометрия* $\{L,\langle x,y\rangle_2\}$ *билинейного* $a+b\sqrt{3}, a,b \in Q$ *метрического пространства путем принятия второй билинейной формы на поле. На поле* ***Q*** *рациональных чисел* $L = Q(\sqrt{3}) = \{a+b\sqrt{3}, a,b \in Q\}$ *использовалось двумерное поле, состоящее* $\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *из чисел вида и линейного вида вида.*

Ключевые слова: *площадь, скалярное произведение, рациональное число, линейная форма, коммутативность.*

Abstract: *In the* L *article, the* $\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *geometry of the* $\{L,\langle x,y\rangle_2\}$ *bilinear metric space was studied by taking the second bilinear form on the field. A two-dimensional* ***Q*** *field consisting of numbers of* $a+b\sqrt{3}, a,b \in Q$ *the form* $L = Q(\sqrt{3}) = \{a+b\sqrt{3}, a,b \in Q\}$ *and a linear form of the*$\langle x,y\rangle_2 = x_1y_1 - 3x_2y_2$ *form were used on the field of rational numbers.*

Key words: *area, scalar product, rational number, linear form, commutative.*

Q ratsional sonlar maydoni ustida $L = Q(\sqrt{3}) = \{a + b\sqrt{3}, a, b \in Q\}$ shakldagi ikki o‘lchovli maydon berilgan bo‘lsin. Bu maydon ustida ikkinchi skalyar ko‘paytmani quyidagicha aniqlaymiz: $a = a_1 + a_2\sqrt{3}, b = b_1 + b_2\sqrt{3}$ elementlar uchun quyidagi $\langle a, b\rangle_2 = a_1b_1 - 3a_2b_2$ ko‘rinishda bo‘ladi. Bu ifodani skalyar ko‘paymaning shartlariga tekshiramiz:

1. $\forall a, b \in L$ elementlar uchun, quyidagi

$$\langle a, b\rangle_2 = \langle b, a\rangle_2 \ (*)$$

tenglik bajarilishini ko‘rsatamiz: Tenglikning chap tomonidan quyidagi $\langle a, b\rangle_2 = a_1b_1 - 3a_2b_2$ tenglik kelib chiqadi. Tenglikning o‘ng tomonidan quyidagi $\langle b, a\rangle_2 = b_1a_1 - 3b_2a_2$ tenglik kelib chiqadi. Q ratsional sonlar maydonining kommutativligidan $(*)$tenglik bajariladi.

$\forall a, b \in L$va $\lambda \in Q$ elementlar uchun, quyidagi

$$\lambda\langle a, b\rangle_2 = \langle \lambda a, b\rangle_2 \ (**)$$

tenglik bajarilishini ko‘rsatamiz:Tenglikning chap tomonidan quyidagi $\lambda\langle a, b\rangle_2 = \lambda(a_1b_1 - 3a_2b_2) = \lambda a_1b_1 - 3\lambda a_2b_2$ tenglik kelib chiqadi. Tenglikning o‘ng tomonidan quyidagi $\langle \lambda a, b\rangle_2 = \lambda a_1b_1 - 3\lambda a_2b_2$ tenglik kelib chiqadi. Yuqoridagi tengliklardan ko‘rinadiki $(**)$tenglik bajariladi.

$\forall x, y, z \in L$elementlar uchun, quyidagi

$$\langle x + y, z\rangle_2 = \langle x, z\rangle_2 + \langle y, z\rangle_2 \ (***)$$

tenglik bajarilishini ko‘rsatamiz.Tenglikning chap tomonidan quyidagi $\langle x + y, z\rangle_2 = (x_1 + y_1)z_1 - 3z_2(x_2 + y_2)$

tenglik kelib chiqadi. Tenglikning o‘ng tomonidan quyidagi

$\langle x, z\rangle_2 + \langle y, z\rangle_2 = x_1z_1 - 3x_2z_2 + y_1z_1 - 3y_2z_2 = (x_1 + y_1)z_1 - 3z_2(x_2 + y_2)$

tenglik kelib chiqadi. Bu tengliklardan (***) tenglikning bajarilishi kelib chiqadi.

Demak, $\langle a, b\rangle_2 = a_1b_1 - 3a_2b_2$ ikkinchi skalyar ko‘paytmasi uchun skalyar ko‘paytmaning barcha xossalari bajariladi.

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