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**Toshikazu Abe\*** (abebin08@gmail.com), Dairokuminamigaokasou 15, 1-360-4 Daigakuminami, Nishi-ku, Niigata, Niigata 950-2111, Japan. *A Mazur-Ulam theorem for the generalized gyrovector spaces.*

In special relativity, the Einstein velocity addition is non-commutative and non-associative. It does not have a group structure and hence does not have a linear space structure. However, it has a gyrocommutative gyrogroup structure and is called the Einstein gyrogroup. The concept of gyrocommutative gyrogroups is a generalization of the concept of commutative groups. Some gyrocommutative gyrogroups giving rise to gyrovector spaces. The concept of gyrovector spaces is a generalization of the concept of inner product spaces.

The celebrated Mazur-Ulam theorem states that a surjective isometry between real normed spaces is a real linear isomorphism followed by translations. This asserts that a bijection between real normed spaces which preserves the metric structure also preserves the algebraic structure automatically.

In this talk, we define the concept of generalized gyrovector spaces (in short, GGVS's). It is a common generalization of the concept of gyrovector spaces and of real normed spaces. A typical example of GGVS's is the positive definite cone of a unital  $C^*$ -algebra. We give a generalization of the Mazur-Ulam theorem for GGVS's. (Received August 24, 2015)