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A Survey of My Recent Research

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In this note, we will describe a short survey with respect to the recent works of Noriaki Kamiya (author) mainly.

The author study is in non associative algebras related with mathematical physics. In particular, we (author) are interesting for the subjects as following; triple systems, Lie algebras or super algebras constructed from triple systems, triality algebras (containing structurable algebras), triality groups (containing automorphism groups of Lie algebras).

It seems that the concept of a triple system (or called a ternary algebra) in non associative algebras started from the metasymplectic geometry due to Freudenthal. After a generalization of the concept has been studied by Tits, Koecher, Kantor, Yamaguti, Allison et al. [1-6]. Also it is well known the object of investigation of Jordan and Lie algebras with application to symmetric spaces or domains [7] and to physics [8,9].

Non associative algebras are rich in of mathematics, not only for pure algebra differential geometry, but also for representation theory and algebraic geometry. Specially, the Lie algebras and Jordan algebras plays an important role in many mathematical and physical objects. As a construction of Lie algebras as well as Jordan algebras, we are interested in characterizing the Lie algebras from view point of triple systems [1,10-12]. These imply that we are considering to structure of the subspace L_1 of the five graded Lie (super) algebra $L(\varepsilon,\delta)=L_{-2}\oplus L_{-1}\oplus L_0\oplus L_1\oplus L_2$ satisfying $[L_i,L_j]\subseteq L_{i+j}$, associated with an (ε, δ) Freudenthal-Kantor triple system which contains a class of Jordan triple systems related 3 graded Lie algebra $L_{-1}\oplus L_0\oplus L_1$. For these considerations without utilizing properties of root systems or Cartan matrices, we would like to refer to the articles of the present author and earlier references quoted therein [2,3,13-17]. In particular, for an characterizing of Lie algebras, an applying to geometry and physics, we have introduced couple topics about a symmetry of Lie algebras and a definition of hermitian triple systems in "Examples of Freudenthal-Kantor triple systems, "published by JGLTA (2014) recently [18]. More precisely speaking, in the paper, first, the symmetry group of Lie algebras and super algebras constructed from (ε, δ) Freudenthal-Kantor triple systems has been studied. Especially, for a special (ε,ε) Freudenthal-Kantor triple, it is SL (2) group. Secondly, we give a definition of hermitian* generalized Jordan triple systems and the examples of their tripotents defined by elements c of triple systems satisfying $ccc=c$. This concept is a generalization of Hermitian Jordan triple systems related symmetric bounded domains.

In final, the author has several coworks with Prof. Okubo, Kantor, Elduque, Mondoc, Shibukawa, and Sato etc, (Europe, U.S.A., Japan) with respect to non associative algebras and mathematical physics.

Thus from these reasons, our fields will be glow up as the object in future.

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