

# Reserch Result

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My main reserch is to study the transformation group theory from topological view point. I mention my reserch along the list of my papers.

(1) In the paper "On the construction of smooth  $SL(m, \mathbf{H}) \times SL(n, \mathbf{H})$ -actions on  $S^{4(m+n)-1}$ , Bull. of Yamagata Univ. Nat. Sci. 15-3(2003)." I constructed actions of smooth  $SL(m, \mathbf{H}) \times SL(n, \mathbf{H})$  on  $S^{4(m+n)-1}$  and showed there are infinitely many smooth  $SL(m, \mathbf{H}) \times SL(n, \mathbf{H})$ -actions on  $S^{4(m+n)-1}$ . The reserch of smooth non-compact Lie group actions is now a developmental stage. Hence it is important to know many examples.

(2) In the paper "Classification of compact transformation groups on complex quadric with codimension one orbit. (preprint)" I completely classified the pair  $(G, M)$  where  $M$  is a manifold which has the same cohomology ring of a complex quadric and  $G$  is a compact Lie group which acts on  $M$  with codimension one orbits. The interesting result is there exists a manifold  $M$  which is not a complex quadric.

(3) In the paper "On the  $SL(3, \mathbf{R})$  action on 4-sphere. (preprint)" I showed the  $SO(3)$ -action on  $S^4$  which is induced from adjoint action is extendable to the smooth  $SL(3, \mathbf{R})$ -action from constructing the smooth  $SL(3, \mathbf{R})$ -action on  $S^4$ . This gives an affirmative answer for Fuichi Uchida's problem in 1985 (see "F. Uchida: *Construction of a continuous  $SL(3, \mathbf{R})$  action on 4-sphere*, Publ. Res. Inst. Math. Sci. **21** (1985), 425-431." or (P2) in "F. Uchida - K. Mukoyama: *Smooth actions of non-compact semi-simple Lie groups*, A. Bak et al. (eds.), Current Trends in Transformation Groups, Kluwer Acad. Publ., 201-215."). Now that we get this result, we will be able to consider the classification problem of  $SL(3, \mathbf{R})$ -actions on  $S^4$ .