Kakutani, S.
Osaka J. Math.
18 (1981), 533–554

EQUIVARIANT *KO*-RINGS AND *J*-GROUPS OF SPHERES WHICH HAVE LINEAR PSEUDOFREE S^1-ACTIONS

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(Received January 30, 1980)

1. Introduction

In this paper, we consider the equivariant *KO*-rings and *J*-groups of spheres which have linear pseudofree circle actions.

Let S^1 be the circle group consisting of complex numbers of absolute value one. For a sequence $p=(p_1, p_2, \cdots, p_m)$ of positive integers, we define the S^1-action φ_p on the complex m-dimensional vector space C^m by

$$\varphi_p(s, (z_1, z_2, \cdots, z_m)) = (s^{p_1}z_1, s^{p_2}z_2, \cdots. s^{p_m}z_m)$$

and denote by

$$S^{2m-1}(p_1, p_2, \cdots, p_m)$$

the unit sphere S^{2m-1} in C^m with this action φ_p. Then the S^1-action on $S^{2m-1}(p_1, p_2, \cdots, p_m)$ is said to be *pseudofree* (resp. *free*) if $(p_i, p_j)=1$ for $i \neq j$ and $p_i>1$ for some $1 \leqq i \leqq m$ (resp. $p_1=p_2=\cdots=p_m=1$) (see Montgomery-Yang [19], [20]).

The main results of our paper are as follows:

Theorem 4.7. *Let p_i $(1 \leqq i \leqq m)$ be positive odd integers such that $(p_i, p_j)=1$ for $i \neq j$. Then there is a monomorphism of rings:*

$$\Phi\colon KO_{S^1}(S^{2m-1}(p_1, p_2, \cdots, p_m)) \to KO(CP^{m-1}) \oplus \bigoplus_{i=1}^{m} RO(Z_{p_i}) .$$

(For details see §4.)

Let G_i $(i \geqq 1)$ denote the stable homotopy group $\pi_{n+i}(S^n)$ $(n \geqq i+2)$. We define $s(k)=\prod_{i=1}^{k} |G_i|$ for $k>0$, where $|G_i|$ denotes the order of the group G_i and put $s(-1)=1$.

Theorem 5.4. *Let p_i $(1 \leqq i \leqq m)$ be positive odd integers such that $(p_i, p_j)=1$ for $i \neq j$ and $(p_i, s(2m-3))=1$ for $1 \leqq i \leqq m$. Then there is a monomorphism of groups:*