10. *Dimension of the Fixed Point Set of Z_{p^r}-actions*

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§ 1. **Introduction.** Concerning the dimension of the fixed point set of G-actions, much has been studied [3], [1], [2], [9], [10], [7], and [8]. In this note, we consider a Z_{p^r}-action (M^n, ϕ, Z_{p^r}) on a closed oriented manifold M^n and study the relation between the bordism properties of M^n and the dimension of the fixed point set. If the action is regular, such a problem was studied in [8]. Here we are concerned with general Z_{p^r}-actions.

In order to state the results, we introduce the following notations. Denote by Ω_n the Thom group of all bordism classes $[M^n]$ of closed oriented smooth n-manifold M^n. Let $\Omega(4j)$ be the subring of $\Omega_*\otimes Z_p$ generated by $\{\Omega_0, \Omega_4, \Omega_8, \cdots, \Omega_{4j}\}$. Let $F(Z_{p^r}, k)$ be the subring of $\Omega_*\otimes Z_p$ generated by those bordism classes which are represented by a manifold admitting a Z_{p^r}-action such that the dimension of the fixed point set is less than or equal to k.

Then we have

Theorem. (1) $F(Z_{p^r}, 4k)=F(Z_{p^r}, 4k+1)=\Omega(4kp^r+2p^r-2)$

(2) $F(Z_{p^r}, 4k+2)=F(Z_{p^r}, 4k+3)=\Omega(4kp^r+4p^r-4)$.

Remark. If $k=-1$, then Theorem means the main result of Conner-Floyd [4].

Corollary 1. *Let (M, Z_{p^r}) be a Z_{p^r}-action. If $[M]$ is indecomposable in $\Omega_*\otimes Z_p$, then there exists a component of the fixed point set of dimension greater than or equal to*

$$\frac{\dim M}{p^r}-2.$$

Corollary 2. *Each element $x\in\Omega_m$ has a representative which admits a Z_{p^r}-action with fixed point set of dimension less than or equal to m/p^r.*

Throughout this paper, p denotes an odd prime integer.

The results in this paper are oriented bordism versions of the excellent papers [5], [7] of tom Dieck.

Detailed proof will appear elsewhere.

§ 2. **Outline of the proof.** The following diagram is an oriented bordism version of tom Dieck [5],