Advanced Studies in Pure Mathematics 9, 1986
Homotopy Theory and Related Topics
pp. 319–334

On the Stable Hurewicz Image of Stunted Quaternionic Projective Spaces

M. C. Crabb, K. H. Knapp and K. Morisugi

§ 0. Introduction

Let HP^n $(0\leqq n\leqq\infty)$ be the quaternionic n-dimensional projective space. We denote the stunted projective space HP^n/HP^{m-1} by HP^n_m $(1\leqq m\leqq n\leqq\infty)$. For a space X with a base point, $\pi^s_*(X)$ means the stable homotopy groups of the space X.

Let

$$h\colon \pi^s_{4n}(HP^\infty_m)\longrightarrow H_{4n}(HP^\infty_m; Z)\cong Z$$

be the stable Hurewicz homomorphism. Let $h_{n,m}$ be the index of the subgroup Image h in $H_{4n}(HP^\infty_m)$. Our main interest in this paper is in the following problem.

Problem 1. *Determine the number* $h_{n,m}$.

Notice that the above problem can be stated as follows.

Problem 2. *Determine the stable order of the attaching map* $\varphi_{n,m}$ *of the top cell in the space* HP^n_m.

Therefore the e-invariants of the map $\varphi_{n,m}$ give a lower bound $h^A_{n,m}$, say, for $h_{n,m}$, that is, $h^A_{n,m}$ divides $h_{n,m}$.

There is a folk-lore conjecture which asserts that this lower bound $h^A_{n,m}$ is actually equal to the number $h_{n,m}$. For the case $m=1$, the conjecture was verified by several authors [12] [13] [14], and the case $m=2$ is treated in [7].

Let CP^∞ be the infinite dimensional complex projective space. Using the transfer map $t\colon HP^\infty\to CP^\infty$ it is easy to see that the odd-primary component of the number $h_{n,m}$ can be determined from the solution of the similar problem for the complex projective space. And the complex case is treated in [4] [5]. So in this paper we consider only the 2-primary

Received January 9, 1985.