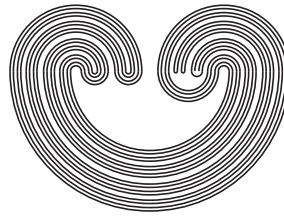


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THE $K(1)$ BASED BOUSFIELD-KAN SPECTRAL SEQUENCE OF CERTAIN TORIC SPACES

by

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THE $K(1)$ BASED BOUSFIELD-KAN SPECTRAL SEQUENCE OF CERTAIN TORIC SPACES

DAVID ALLEN AND JOSÉ LA LUZ

ABSTRACT. In this paper we compute the homotopy groups of the unstable $K(1)$ -completion of the Borel space for a class of simplicial complexes \mathcal{L} that can be realized as the join $\mathcal{L} = \partial(\Delta^{k-1}) * \Delta^j$ for some j and k . This decomposition allows for the differentials in a certain unstable Bousfield-Kan spectral sequence to be determined and for explicit calculations to be made.

1. INTRODUCTION

It is common practice to use a Bousfield-Kan spectral sequence (BKSS) to compute the homotopy groups of spaces X localized at a prime, p . In general, computing the E_2 -term of this spectral sequence is difficult. In [9] a Composite Functor spectral sequence (CFSS) was constructed. Its E_2 -term is an Ext in an abelian category and converges to the E_2 -term of the BKSS. To compute this spectral sequence the higher derived functors of the primitive element functor- P of the E -homology of X must be computed where E is a suitable spectrum [9]. In addition, the comodule structure of the $R^i P E_*(X)$ in the category of unstable U -comodules must be computed [9]. Spaces with primitive dimension less than two allows one to obtain a long exact sequence of E_2 -terms of the BKSS. In [16] important properties of $R^i P$ are discussed and the notion of an *injective extension sequence* is defined. In this setting, such a sequence is essentially a short exact sequence in the category of positively graded cocommutative, coalgebras. Furthermore, these sequences induce a long

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