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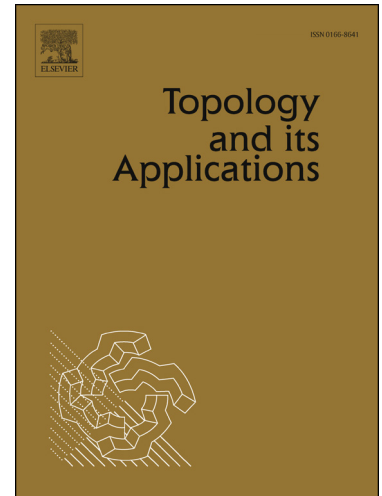
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# The group of self homotopy equivalences of the $m$ -fold smash product of a space

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## Abstract

Let  $\mathcal{E}(X)$  be the set of homotopy classes of self-homotopy equivalences of a space  $X$ . The set  $\mathcal{E}(X)$  is a group by composition of homotopy classes. We study the group  $\mathcal{E}(X^{\wedge m})$  for the  $m$ -fold smash product  $X^{\wedge m}$ . We show that the two obvious homomorphisms  $\varphi : S_m \rightarrow \mathcal{E}(X^{\wedge m})$  and  $\psi : \mathcal{E}(X)^m \rightarrow \mathcal{E}(X^{\wedge m})$  define a homomorphism  $\Psi : \mathcal{E}(X)^m \rtimes S_m \rightarrow \mathcal{E}(X^{\wedge m})$  for any space  $X$ , where  $\mathcal{E}(X)^m \rtimes S_m$  is the semi-direct product of the product group  $\mathcal{E}(X)^m$  by the symmetric group  $S_m$ . We show that in most cases the homomorphism  $\varphi : S_m \rightarrow \mathcal{E}(X^{\wedge m})$  is a monomorphism and the kernel of  $\Psi$  is isomorphic to the kernel of  $\psi$ . The injectivity of  $\Psi$  is established for the complex projective  $n$ -space  $\mathbb{C}P^n$  ( $n \geq 2$ ), and hence,  $\mathcal{E}((\mathbb{C}P^n)^{\wedge m})$  contains a subgroup isomorphic to  $\{\pm 1\}^m \rtimes S_m$ . Sufficient conditions for  $\Psi$  to be injective are obtained for

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