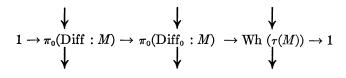
CONCORDANCE OF DIFFEOMORPHISMS AND THE PASTING CONSTRUCTION

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1. Introduction. If N is a smooth manifold, let Diff (N) be the group of diffeomorphisms of N and let $\mathcal{C}(N)$ be the normal subgroup of those diffeomorphisms concordant to the identity. Following the notation of Antonelli-Burghelea-Kahn, we will write Diff $(N)/\mathcal{C}(N) = \pi_0$ (Diff: N). The object of this paper is to develop some techniques towards the computation of the groups π_0 (Diff: N) for a certain class of manifolds N.

We will be interested primarily in the groups π_0 (Diff: ∂M) for smooth compact connected orientable m-manifolds M having the homotopy type of finite k complexes with $2 \leq k$ and $2k + 3 \leq m$. From now on we assume that M satisfies this condition. The first step will be to approximate the groups π_0 (Diff: M) and π_0 (Diff: ∂M) respectively by the groups π_0 (Diff: ∂M) = π_0 (Diff: ∂M) and π_0 (Diff: ∂M) = Diff(∂M)/ ∂M 0 (∂M 1) is the group of end-preserving diffeomorphisms $\partial M \times R \to \partial M \times R$. To express the relations among these groups we introduce the two subsets Wh (∂M) and Wh ($\tau(M)$) of the Whitehead group Wh ($\tau(M)$) defined by Wh ($\tau(M)$) is equal to the group of Whitehead torsions of $\tau(M)$ 0 from $\tau(M)$ 1 is equal to the set of Whitehead torsions of homotopy equivalences $\tau(M)$ 2 and Wh ($\tau(M)$ 3 is equal to the set of Whitehead torsions of homotopy equivalences $\tau(M)$ 3. Then we have a commutative diagram (of crossed homomorphisms) with exact rows and columns



$$\pi_0(\mathrm{Diff}:\partial M) \longrightarrow \pi_0(\mathrm{Diff}_0:\partial M) \longrightarrow \mathrm{Wh}\;(\partial M) \longrightarrow 1$$

where the kernel of π_0 (Diff: ∂M) $\to \pi_0$ (Diff₀: ∂M) is a subquotient of Wh ($\pi_1(M)$). Thus we may use this diagram to make reasonable estimates of π_0 (Diff: ∂M) in terms of π_0 (Diff₀: ∂M); in the case Wh ($\pi_1(M)$) = 0 we have π_0 (Diff: ∂M) = π_0 (Diff₀: ∂M).

Next we seek to compute the group π_0 (Diff₀ : ∂M). In this direction we begin with a homomorphism $d:\pi_0$ (Diff₀ : ∂M) $\to \pi_0$ (Diff₀ : M) such that the following diagram commutes.

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