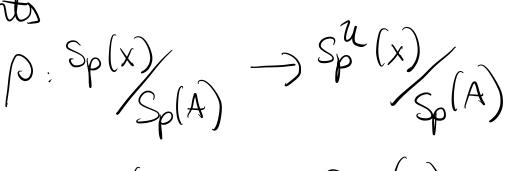
= id

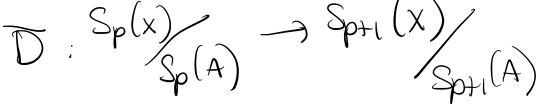
so P is the chain homotopy inverse of $i_c^{\mathcal{U}}$. It follows from homotopy invariance statements that $i_{\mathcal{X}}^{\mathcal{U}}$ is an isomorphism $H_p^{\mathcal{U}}(\mathbf{X}) \xrightarrow{i_{\mathcal{U}}^{\mathcal{U}}} H_p(\mathbf{X})$.

PROOF OF EXCLOSION THEOREM Let U= JA, BY Such that AOB=X. \mathcal{L}_{r} $\mathcal{S}_{o}^{\mathcal{U}}(X) \rightarrow \mathcal{S}_{o}(X)$ is a chain épuivalence. From proof of theorem I we get maps (> & D that map simplices in A to simplices in A.

p and D induce maps on

guotients





It still holds that $\partial \overline{D} + \overline{D} \partial = id - ic^{n} P$ and that $i^{n} \cdot S^{n}(x) \rightarrow S_{0}(x)$ $S_{0}(A)$

is a chain ephivalence and consequently it induces an isomorphism on homology.

 $S_{p}(B) \longrightarrow S_{p}^{u}(X)$ $S_{b}(A \cap B) \longrightarrow S_{p}^{u}(X)$ The map

Induced by inclusion is an isomorphism since both guotient groups are free with the basis Singular p-simplices in B that do not lie m A. => $H_{p}(x,A) \cong H_{p}\left(\begin{array}{c} S^{\mathcal{U}}(x)\\ S(A) \end{array}\right)$ $\cong \mathcal{H}_{p}(\mathcal{B},A\cap\mathcal{B})$



Here is an example of the machinery we developed, a classical result from 1910 due to Brouwer, known as

INVARIANCE OF DIMENSION

If non-empty open sets UCRM and VCRn are homeomorphic, then m=m.

Let XEU. By excision $H_{p}(v, v-\xi x y) \cong H_{p}(\mathbb{R}^{m}, \mathbb{R}^{m}, \xi x y)$ From LES of (RM, RM-EXY) $= H_{p}(\mathbb{R}^{m} - \xi \chi y) \rightarrow H_{p}(\mathbb{R}^{m}) \rightarrow H_{p}(\mathbb{R}^{m}, \mathbb{R}^{m} - \xi \chi))$ $\rightarrow H_{p_1}(\mathbb{R}^m - \xi x y) \rightarrow H_{p_1}(\mathbb{R}^m)$ we get $Hp(\mathbb{R}^m,\mathbb{R}^m,\mathfrak{axy}) \cong Hp,(\mathbb{R}^m,\mathfrak{axy})$ Since $\mathbb{R}^m,\mathfrak{axy}$ strongly deformation

Hetracts to
$$S^{m-1}$$
,
 $H_{\mathcal{P}}(U, U - \xi \chi) \cong H_{\mathcal{P}-1}(S^{m-1}) = \begin{cases} \mathbb{Z} \ p=m \\ 0 \ otherwise \end{cases}$
Homeomorphism $h: U \rightarrow V$ yields
a homeomorphism of pairs
 $(U, U - \xi \chi)$ and $(V, V - \xi h(x))$
and so
 $H_{\mathcal{P}}(U, U - \xi \chi) \cong H_{\mathcal{P}}(V, V - \xi h(x))$.
Since also
 $H_{\mathcal{P}}(V, V - \xi h(x)) \cong H_{\mathcal{P}}(S^{n-1}) = \begin{cases} \mathbb{Z} \ p=n \\ 0 \ otherwise \end{cases}$
 $I + follows + hat m=n.$