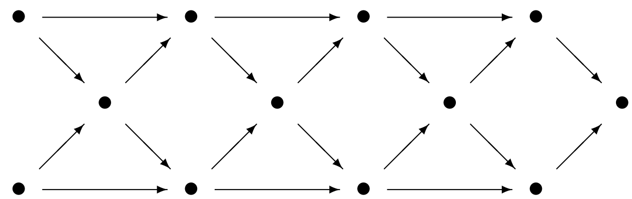
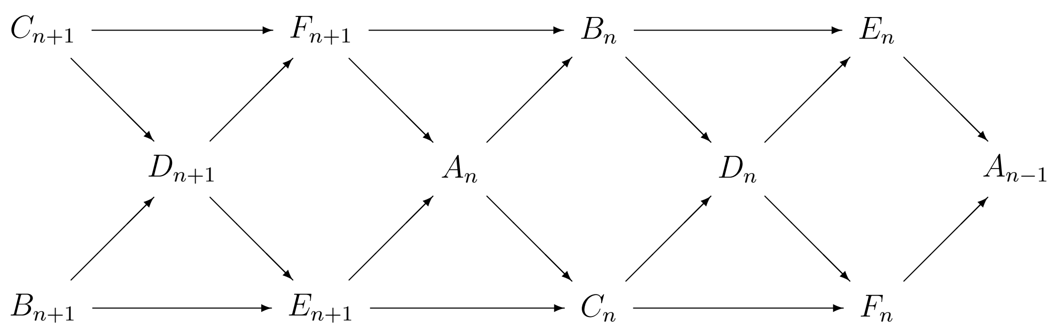
A braid diagram consists of four interlocking exact sequences.



1 Braid diagrams and Mayer-Vietoris exact sequences

In the braid diagram below



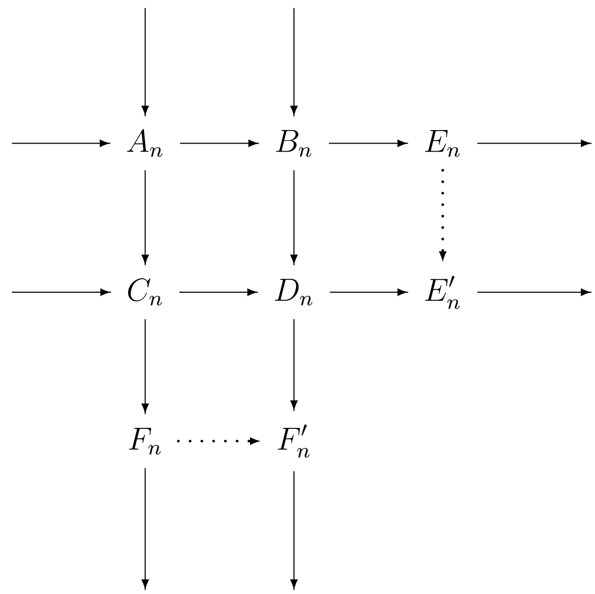
the four exact sequences are ABE, ACF, BDF, and CDE. There is a Mayer-Vietoris exact sequence

$$\cdots \to A_n \to B_n \oplus C_n \to D_n \to \cdots$$

This comment is useful for two reasons. First it produces a Mayer-Vietories exact sequence. Secondly, it gives a guide for placement of groups when writing down a braid diagram.

2 Where do braid diagrams come from?

They come from a commutative diagram



where the dotted lines are isomorphisms and all vertical and horizontal sequences are exact.

3 Two examples

Example 1. Let $X = U \cup V$ be an excisive decomposition ($H_*(U, U \cap V) \to H_*(X, V)$ is an isomorphism). Then there is a braid diagram with

$$\begin{aligned} A_n &= H_n(U \cap V) \\ B_n &= H_n U \\ C_n &= H_n V \\ D_n &= H_n X \\ E_n &= H_n(U, U \cap V) \\ F_n &= H_n(V, U \cap V) \end{aligned}$$

More generally, the homology of a homotopy pushout diagram (a pushout diagram where two maps are cofibrations) gives a braid diagram.

Example 2. Let $X = U \cup V$ be an excisive decomposition. Then there is a braid diagram with

$$\begin{aligned} A_n &= H_n(X, U \cap V) \\ B_n &= H_n(X, U) \\ C_n &= H_n(X, V) \\ D_n &= H_n(U \cup V) \\ E_n &= H_{n-1}(U, U \cap V) \\ F_n &= H_{n-1}(V, U \cap V) \end{aligned}$$