The choice of an ordering for the vertices of a simplex implies its orientation, according to the even or odd permutation of the ordering. The two opposite orientations will be denoted as $+\sigma$ and $-\sigma$. A complex is orientable when all its simplices can be coherently oriented. The oriented $(d-1)$-faces of the d-simplex $\sigma_i = \langle v_{i,0}, \ldots, v_{i,d} \rangle$ are given by the formula:

$$\sigma_{i,j} = (-1)^j \langle v_{i,0}, \ldots, v_{i,j-1}, v_{i,j+1}, \ldots, v_{i,d} \rangle, \quad 0 \leq j \leq d, \tag{1}$$

where $\sigma_{i,j}$ and $v_{i,j}$ denote the jth face and the jth vertex of σ_i, respectively. A similar notation for the oriented $(d-1)$-faces of a d-simplex is attributed by Dieudonné [20] to Eilenberg and Mac Lane. Two adjacent simplices are coherently oriented when their common face has opposite orientations (see Figure 1).