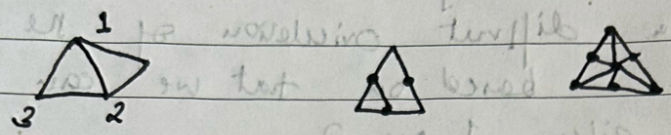
amazon basics

Homework -5

Qn 1] K → triangulation of orientable + no boundry
2 manifold → sphere

Sd K → barycentic division of K.

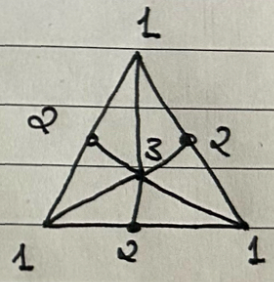
(a) 

So K is a orientable 2 mainfold we know that each adjcent triangle will have the correct or same orientability.
We colour our Sd K as.

a) V1 for orijinal triangle.

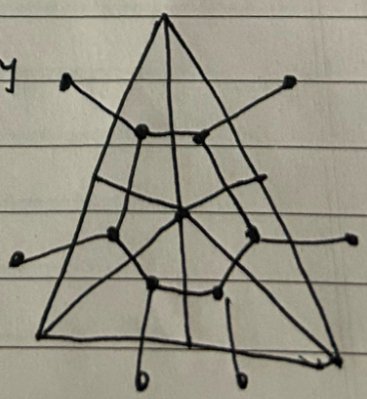
b) V2 for the point b/w the edge.

c) V3 for the centroid.



each triangle will be shared by 2 triangles and the colour for each triangle will follow.

b) So each orijinal triangle has to folowing vertex
→ centroid, midpoint, orijinal vertex.
now we shall create a
Dual graph of this Sd K.



Barycentric Subdivision

To show the Dual of $Sd^k \to$ bipartite
ie show no odd cycles.

as $K \to$ orientable $\to Sd^k \to$ orientable.

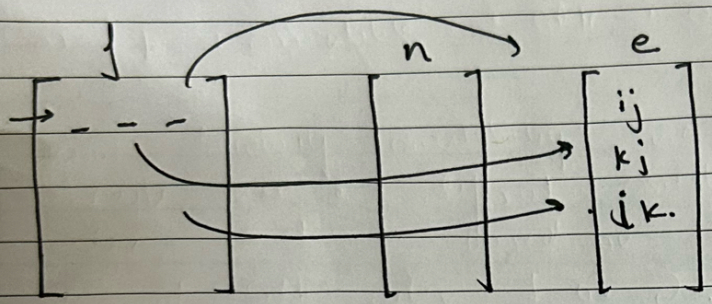
now following orientability we know that each adjacent triangle has a different orientation of the common edge and based on that we can colour the Δ of Sd^k either 1 or 2.

amazon basics

amazon basics

Quiz] A triangulation is a 2-manifold iff each edge is shared by at most 2 triangles.

List



have a edge hash map which goes through each face and adds the edge (i,j) to the list now if (j,i) comes we have a count that makes it 2. any move to have 2 count for a edge makes it a 'not' a 2 manifold.

(a) now here with this set up we can just checks if each are 2 → wrote a code for it in Task-3.

(b) disk → every vertex must have a nbd if homeomorphic to a disk —?

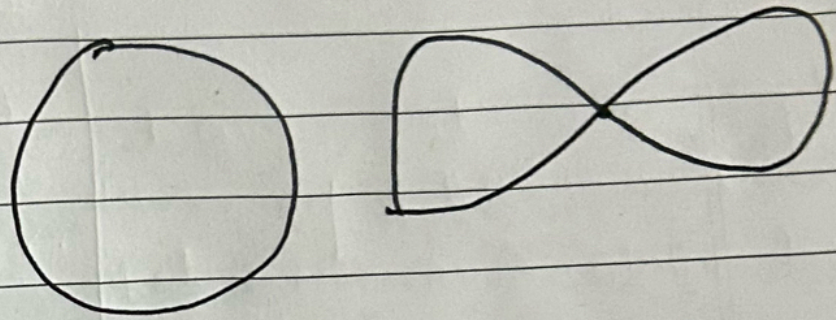
↳ Doubt

amazon basics

Qu:7 from the Internet (mathematics stack exchange)

the sphere S_1 & wedge sum $S_1 \vee S_1$

S_1	$S_1 \vee S_1$
$H_0 \cong$	H_0
$H_1 \cong$	H_1
$H_2 \cong$	H_2



Same connected components.

Same 1-d hole.

0 → holes of higher dimensions.

fundamental grp of $S_1 \rightarrow \mathbb{Z}$

$S_1 \vee S_1 \rightarrow \mathbb{Z} * \mathbb{Z}$

amazon basics

Ans] Using the algorithm formed for Ans we can input any simplex in the form of its faces

↳ find edge list

↳ find boundary, 2

↳ find SNF for each

↳ find betti number.

Ans] Find the attached .ipynb file.