The spine $K_{n,s}$

1 Determine $K_{0,4}$ and $K_{0,5}$

2 Find the dimension of $K_{n,s}$ for any n,s.

3. Construct the links of the vertices ,  and  in $K_{3,0}$

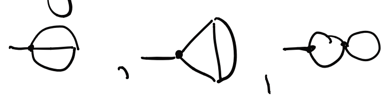
4 We showed that $K_{n,s}$ has the structure of a cube complex. Show that the standard metric on $K_{n,s}$ is not CAT(0) for $n \geq 3$, using Gromov's criterion. (Bridson proved $\mathrm{Out}(F_n)$ cannot act properly and cocompactly on any CAT(0) space).

5 Define a map $K_{n,s} \longrightarrow K_{n,s-1}$ $(s \geq 1)$
Is it injective? surjective?
Define a map $A_{n,s} \longrightarrow A_{n,s-1}$ $(s \geq 1)$
Show that it is surjective. What is the kernel?

Core graphs and jewels

6. Show that $O^c_{n,s}$ is a deformation retract of $O_{n,s}$

7. Construct the jewels for the graphs



$S_\infty(M_n)$

8. Show that $S_\infty(M_3)$ is connected

9*. Question: Is $S_\infty(M_3)$ homotopy equivalent to a 1-dimensional complex?