

# Computational Topology Reading Group - Notes

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## Filtrations

**Definition 0.1.** Let  $K$  be a simplicial complex and  $A$  a set. A map  $\Phi : A \rightarrow \mathbb{R}^{|K|}$

Some interesting loss function and running filtration experiment

Suppose we have a graph where each vertex is a vector of features. For each vertex we define a function. For  $k$  we have a function.

## 1 Autoencoders

We have an input vector  $X \in \mathbb{R}^n$  and an output vector  $\overline{X} \in \mathbb{R}^n$ . Then we have an intermediary vector  $Z \in \mathbb{R}^k$  such that  $k < n$ . We compute a topological loss function for the autoencoder so that (hopefully) topological features are preserved.