- Define permutation equivariance.

- Prove that graph filters are permutation equivariant

- Prove that GNNs are permutation equivariant

- GNNs and graph filters perform label-independent processing of graph signals. Explain formally.

- GNNs exploit signal symmetries. Explain formally.

- Define Lipschitz and Integral Lipschitz filters.

- Compare their properties.

- State a theorem claiming the stability of integral Lipschitz graph filters to scaling of a graph

- This theorem implies that graph filters cannot be discriminative and stable at the same time. Explain

- Prove that integral Lipschitz graph filters are stable to the scaling of a graph.

- This proof can be lengthy, please explain the key steps only. These steps are (i) The computation of the filter difference $\mathbf{H}(\hat{\mathbf{S}}) - \mathbf{H}(S)$. (ii) The calculation of this difference in the GFT domain.

- Remember to keep your explanation to around 5 minutes.

- State a theorem claiming the stability of GNNs with layers made up of integral Lipschitz filters to scaling of a graph

- This theorem implies that GNNs can be discriminative and stable at the same time. Explain

- Prove that GNNs with layers made up of integral Lipschitz filters are stable to scaling of a graph