

- ▶ When using a graph filter, higher frequencies are more difficult to process. Explain.
- ▶ Integral Lipschitz filters are stable because either the eigenvalue does not move. Or the filter does not move. Explain.
- ▶ Slides 35 and 36.

- ▶ We have signals v_i and v_j aligned with eigenvectors of a shift operator. Explain how these signals can be discriminated with graph filters
- ▶ What happens when the shift operator is perturbed?
- ▶ Stability and discriminability are incompatible when we use graph filters. Explain
- ▶ Slides 43 through 45

- ▶ We have signals v_i and v_j aligned with eigenvectors of a shift operator. Explain how these signals can be discriminated with a GNN
- ▶ What happens when the shift operator is perturbed?
- ▶ Stability and discriminability are compatible when we use graph neural networks. Explain
- ▶ Slides 49 through 52

- ▶ We claim that stability analyses are a key to explaining the improved performance of GNNs relative to graph filters.
- ▶ This is a reasonable claim because stability is more important than equivariance in practice. Explain.
- ▶ Are there other advantages to knowing that GNNs can be stable when graph filters can't?
- ▶ Are there situations where you expect GNNs to have marginal advantages with respect to graph filters?

- ▶ Graph filters outperform linear regression. Show this is true of recommendation systems. Use results you obtained in your lab responses.

- ▶ The improved performance of graph filters is due to their ability to exploit permutation symmetries. Explain

- ▶ Graph neural networks outperform fully connected neural networks. Show this is true of recommendation systems. Use results you obtained in your lab responses.

- ▶ The improved performance of GNNs is due to their ability to exploit permutation symmetries. Explain

- ▶ Graph neural networks outperform graph filters. Show this is true of recommendation systems. Use results you obtained in your lab responses.

- ▶ The improved performance of GNNs is due to their better stability vs discriminability tradeoff. Explain

- ▶ You can transfer a GNN to a network with a larger number of nodes.
- ▶ Why is this possible?
- ▶ Why do you expect this to work well?