- Consider a sequence of graph signals converging to a graphon signal. For a given set of filter coefficients define: A sequence of graph filters. A graphon filter. The graph and graphon filter frequency response. The graph filter frequency representation. The graphon filter frequency representation.

- They are all the same polynomial. Explain.

- Prove that the frequency representations of the graph filter sequence converges to the frequency representation of the graphon filter. This proof is a one-liner.

- For the same setup in Figure 1, convergence of graph filter outputs does not follow from convergence of frequency representations. Explain

- It is, however, possible to prove a theorem claiming convergence of filters with Lipchitz frequency responses. State the theorem and discuss its implications.

- Given a filter for which $h(\lambda) = 0$ for all $|\lambda| \leq c$ we can bound the difference between the output of the graph filter and the output of the graphon filter by a quantity that is of order $1/\sqrt{n}$. State the theorem.

- Explain relevant terms and constants.

- State a theorem that bounds the difference in graph and graphon filter outputs for a filter that has low variability around 0.

- Explain relevant terms and constants.

- Explain the concept of transferability of a graph filter

- State a theorem showing that graph filters are transferable

# Lecture 10, Question 6

- Almost all filters are transferable in the limit. Explain

- Filters that are more discriminative are more difficult to transfer. Explain

- Transferability and discriminability are incompatible in graph filters. Explain

- Define a graphon neural network (WNN).

- WNNs do not exist in reality. Explain.

- Why then, do we define WNNs?

- Use WNNs to explain that GNNs inherent the transferability properties of graph fiters.