- Define a graph convolutional filter of order k. Explain

- Define a graph neural network with 2 layers.

- In a recommendation system, the user similarly graph has adjacency matrix $\mathbf{S}$ and user ratings are grouped in the vector $\mathbf{x}$. The entries of $\mathbf{x}$ that are not rated are zero. A common way of predicting ratings is the product $\mathbf{y} = \mathbf{S}\mathbf{x}$. Why is this a good idea?

- In a distributed multiagent systems, agents can communicate with nearby peers. This defines a communication graph $\mathbf{S}$. A graph filter can be implemented in a way in which nodes exchange information over the communication graph. Explain.

- A CNN is a particular case of a GNN. Explain.

- A GNN is a particular case of a fully connected NN. Explain.

- The definition given for convolutional filters in time is different from the usual. Show that it is equivalent.

- The definition given for convolutional filters for images is not exactly equivalent to the usual definition. Explain.