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Alejandro Ribeiro*, 101 Crosshill Rd, Wynnewood, PA 19096. *Graph Neural Networks: Architectures, Stability and Transferability.*

Graph Neural Networks (GNNs) are information processing architectures for signals supported on graphs. They are presented here as generalizations of convolutional neural networks (CNNs) in which individual layers contain banks of graph convolutional filters instead of banks of classical convolutional filters. Otherwise, GNNs operate as CNNs. Filters are composed with pointwise nonlinearities and stacked in layers. It is shown that GNN architectures exhibit equivariance to permutation and stability to graph deformations. These properties provide a measure of explanation respecting the good performance of GNNs that can be observed empirically. It is also shown that if graphs converge to a limit object, a graphon, GNNs converge to a corresponding limit object, a graphon neural network. This convergence justifies the transferability of GNNs across networks with different number of nodes. (Received January 19, 2021)