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# Inverse Problems Seminar

## *Approximation Theory of Deep Learning from the Dynamical Systems Viewpoint*

*Dr. Qianxiao Li*  
*National University of Singapore*

### Abstract

In this talk, we present some recent results on the approximation theory of deep learning from the dynamical systems viewpoint. This viewpoint highlights a key new aspect of modern deep learning, namely the presence of compositional/dynamical structures. We first discuss mathematical frameworks to study the capacity of deep feed-forward architectures for function approximation. Next, we discuss approximation theories of modern architectures for sequence modelling, including recurrent neural networks, dilated convolutional networks (WaveNet), and encoder-decoder structures. These analyses reveal some interesting connections between approximation, dynamics, memory, sparsity and low rank phenomena that may guide the practical selection and design of these network architectures.

Date: 3 November 2022 (Thursday)  
Time: 10:00am – 11:00am (Hong Kong Time)  
ZOOM link: <https://cuhk.zoom.us/j/98241093146>  
Meeting ID: 982 4109 3146

*All are Welcome*