IDL Exercise 2.

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April 2025

1 Theoretical Questions:

1.1 LTI

. Show that a convolution with respect to any filter h is time/space invariant.

1.2 TI.

Explain whether each of the following layers are time/space invariant or not:

1. Additive constant
2. Pointwise nonlinearity (such as ReLU)
3. Strided pooling by a factor ¿ 1
4. As a result, is a CNN composed of all these operators (+convolution) time invariant?

1.3 Layers' Jacobian.

Calculate the Jacobian matrix of the following layers:

1. Additive bias vector
2. General Matrix multiplication
3. Convolution layer