



Deep Learning for Damage and Load Identification in Structural Dynamics

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Luca Rosafalco
PhD candidate, Politecnico di Milano
luca.rosafalco@polimi.it

Seminar *CS³@DICA*

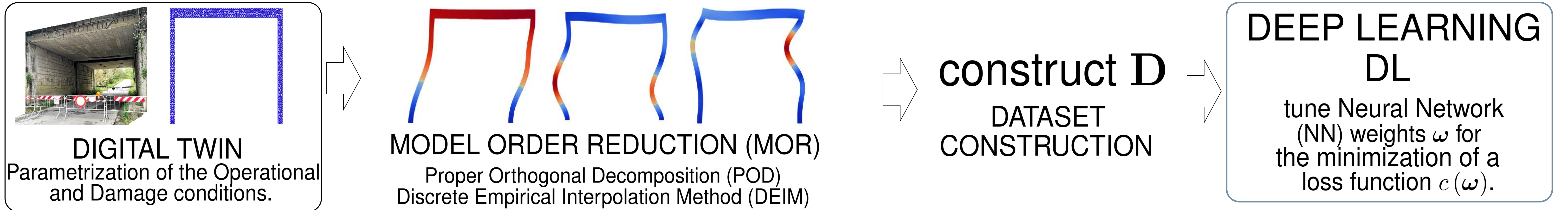
Structural Health Monitoring (SHM) aims to assess the damage state of structures.

Vibration-based SHM operates by analysing displacement and/or acceleration recordings shaped as Multivariate Time Series (MTS).

Damage identification consisting in detecting, locating and identifying damage.

Load Identification to improve the effectiveness of the SHM system (operational conditions affect the vibration response).

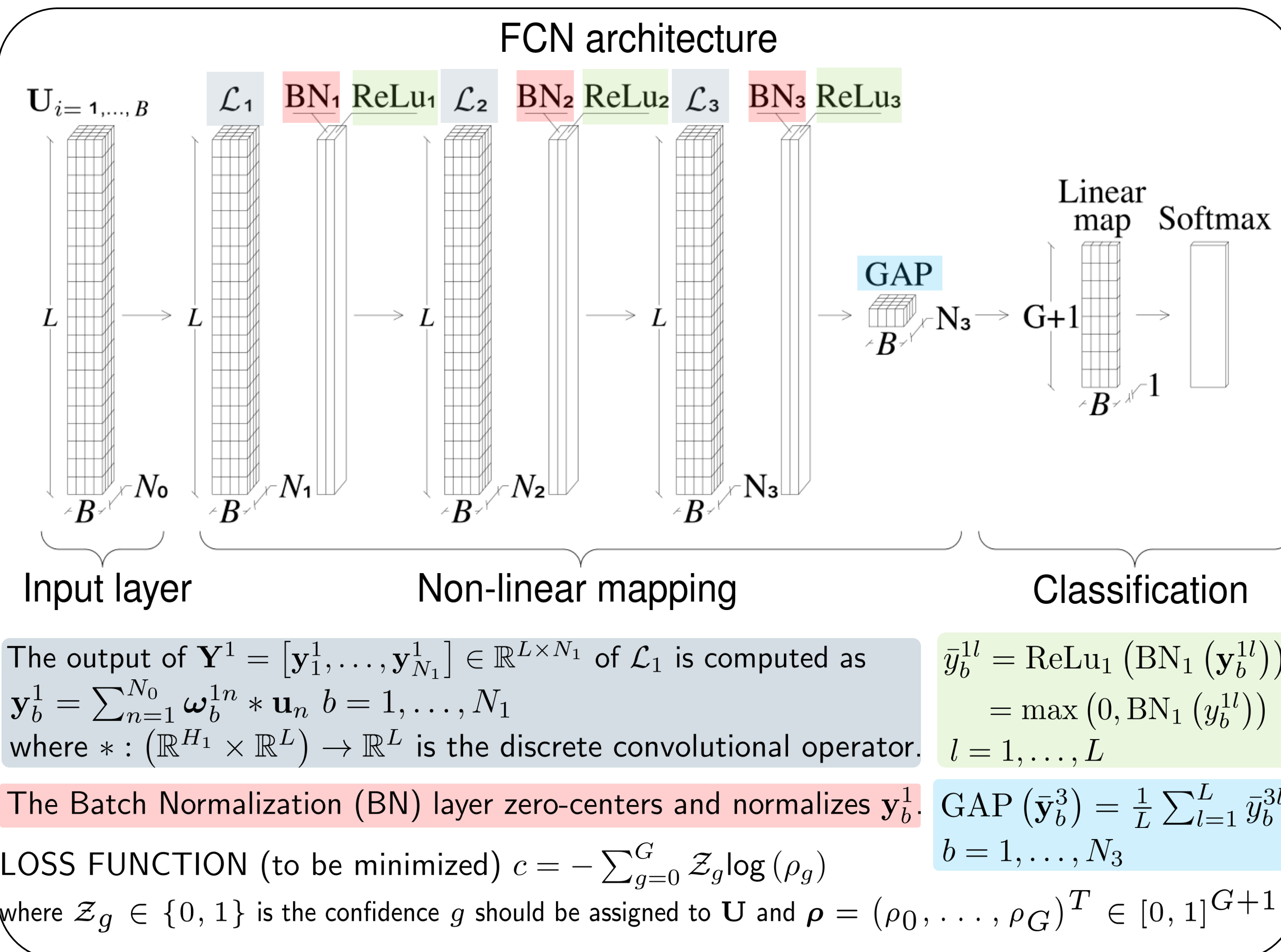
Methodology



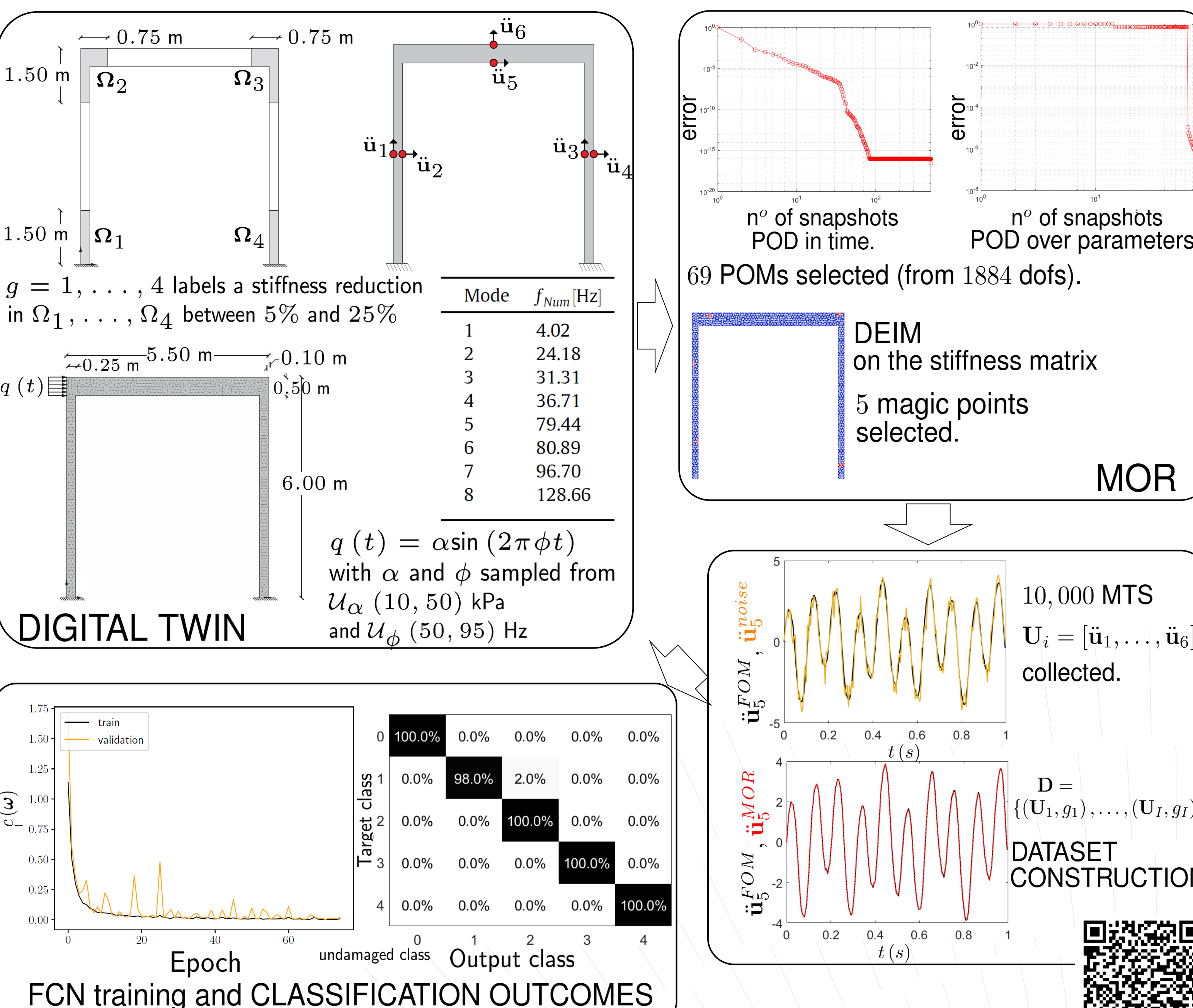
The response of a building in **damage conditions** is usually not available. Several **loading conditions** can be simulated.

Feature extraction and classification task are accomplished on the acquired MTS by using **Fully Convolutional Networks (FCN)**.
Regression task is carried out on the reduced generative latent space determined by an **AutoEncoder (AE)** NN architecture.

DAMAGE IDENTIFICATION [1]



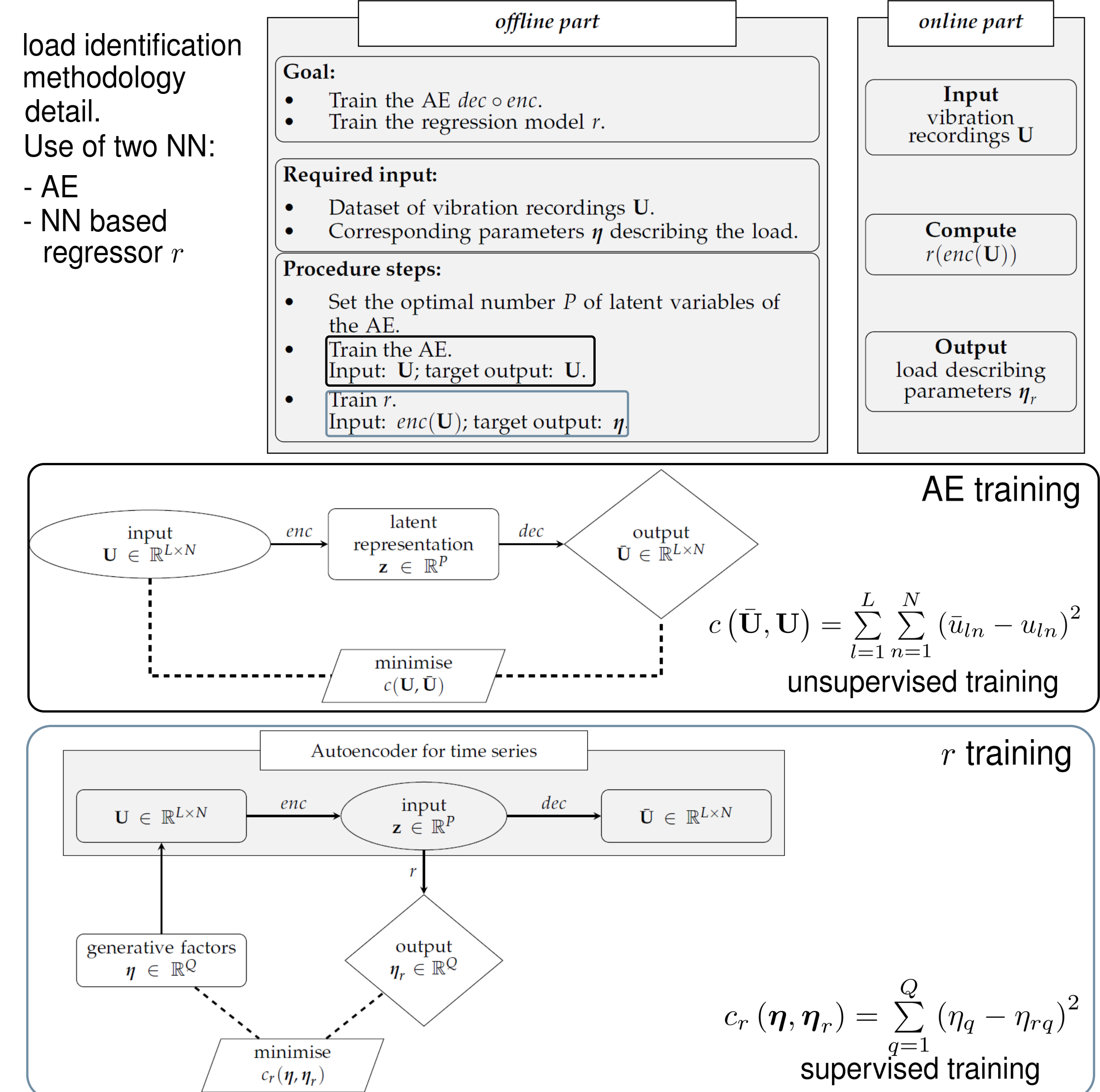
Numerical results



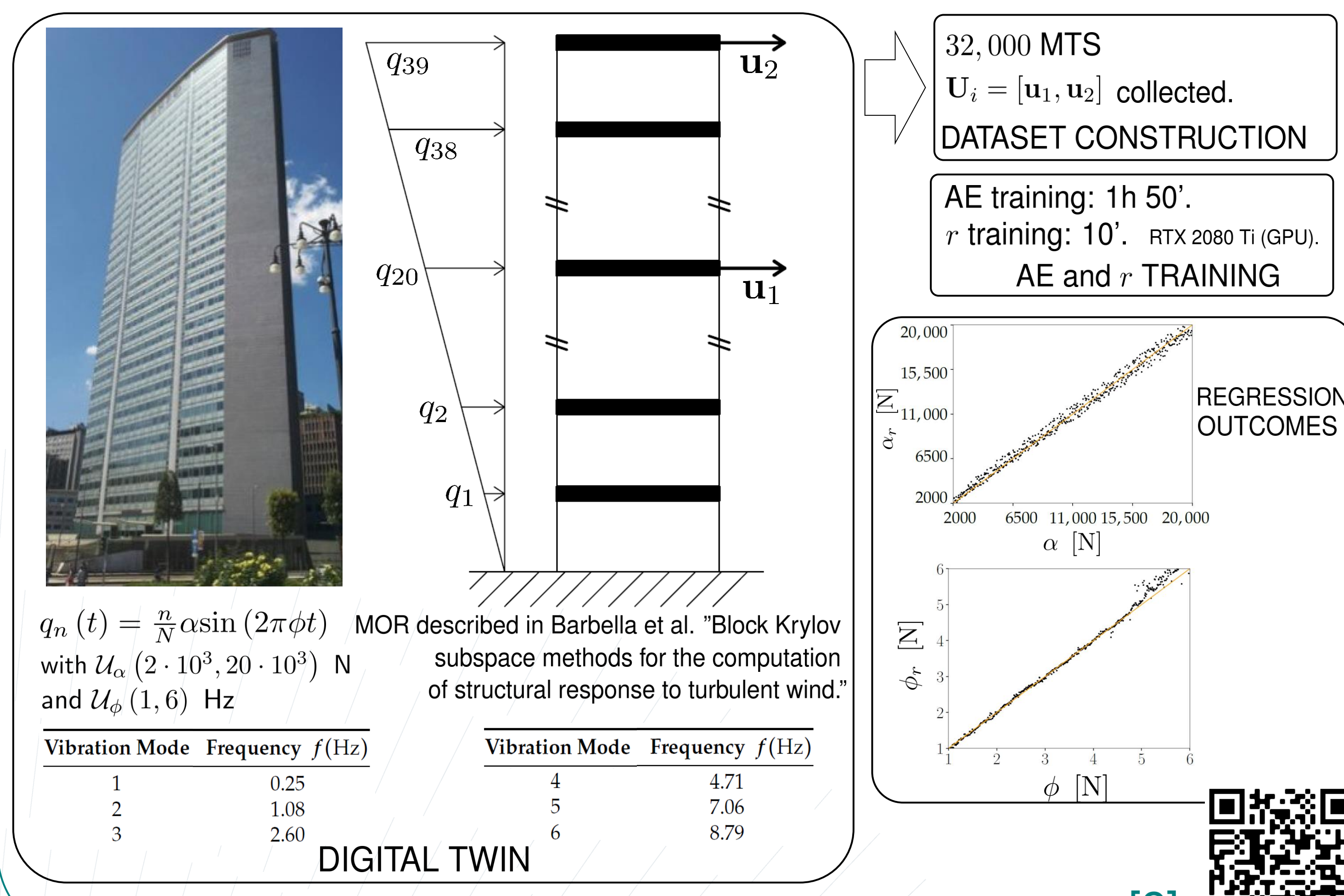
paper [1]:



LOAD IDENTIFICATION [2]



Numerical results



paper [2]:

