# Characterization of pile stiffness using Artificial Neural Networks

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## ABSTRACT

In order to determine the flexibility of pile foundations, appropiate models that include the soil-pile interaction mechanism should be considered. These types of models are usually complex and involve a high computational cost, making it difficult to transfer knowledge to other applications. In the literature, simplified expressions (e.g. [1, 2]) have been proposed to evaluate the stiffness of the piles in an efficient way, admitting some uncertainty in the result. The objective of this work is to build a surrogate model based on artificial neural networks (ANN) capable of predicting the stiffness of a pile foundation.

A dataset is generated to train the ANN. This synthetic data include the variables that define the foundation and the surrounding soil, and the foundation stiffness, which is evaluated through a previously developed continuous formulation [3]. Comparing the ANN predictions with the results obtained through the numerical tool, its potential to act as surrogate model is observed. The proposed ANN can be used to efficiently estimate the flexibility of pile foundation, without a significant loss of accuracy with respect to rigorous soil-pile interaction models.

## REFERENCES

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