

Expressivity of Graph Neural Networks: ReLU vs. Sigmoid GNNs

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Resumen. Graph Neural Networks (GNNs) form a powerful computational framework for machine learning on graphs with many applications. However, many open questions exist regarding how the chosen activation function affects expressivity, trainability and generability. In this short communication, we show that ReLU GNNs are more expressive than Sigmoid GNNs. However, we also show that Sigmoid GNNs are expressive enough so that this gap is not significant in practice, meaning that the comparison between ReLU and Sigmoid GNNs should be done in terms of trainability and generability.

This is work accepted and presented at ICLR'25 [1].

Palabras clave: machine learning; GNN; GC2 query; expressivity; sigmoid.

Referencias

- [1] S. Khalife and J. Tonelli-Cueto (2025). Is uniform expressivity too restrictive? Towards efficient expressivity of GNNs. *The Thirteenth International Conference on Learning Representations (ICLR 2025)*. <https://openreview.net/forum?id=1svGqR60Tf>.

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