

# Mathematical operators and artificial intelligence: a new approach in physics

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Artificial Intelligence (AI) refers to the set of activities performed by a machine that attempt to replicate behaviours considered intelligent by humans. Today, it encompasses a multitude of fields such as image recognition, autonomous driving or recommender systems. Physics is not blind to these and other recent developments in AI and new techniques are being introduced nowadays.

A relatively little known and recently developed facet is the use of AI to solve mathematical problems. The last includes Physics-Informed Neural Networks (PINNs), Deep Operator Networks (DeepONet) and Fourier Neural Operator Networks (FNON), among others. In the Institute of Nanoscience and Materials of Aragón (INMA), which is a joint Institute between CSIC and the University of Zaragoza, we initiated several works in the use of these techniques to solve simple differential equations. Our aim here is to extend the possible applications of these techniques to physics and go into their mathematical basis.