

# Physics Informed Neural Networks (PINN) for PDEs solving based on the simulation of a ray tracing method

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Recently, an original method for solving PDEs using a physical approach has been proposed, combining the efficiency of Deep Learning, the reliability of physical modelling, and the possibility to include actual measurements, giving an hybrid feature to the method. An originality of PINN, compared to classical numerical methods such as Finite Elements, is the fact that the computed solution is continuous simultaneously in space and in time. Also, once the learning step is completed, the resolution is direct, and requires no additional time.

During this week, the aim will be to apply this method on a simple PDE, to evaluate its performances, and its relevance, in the specific context where the anchoring points are obtained not directly from solution at continuous level, but from statistical analysis of a set of realizations of a discrete model approximating the continuous one. Specific attention will be paid to reliability with respect to the number of realizations, and scaling between dimensions.