

# XLII SEMANA DE LA MATEMÁTICA

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CONFERENCIA

## **On the calculation of potential coefficients in quantum mechanics using artificial neural networks**

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### **RESUMEN**

A method to compute a set of potential coefficients using eigenvalues of the Schrödinger operator is presented. The finite element method is used to solve repeatedly, considering different coefficient values of the chosen potential function, the direct problem by training a direct radial basis neural network. A map of eigenvalues, as function of the mentioned set, is then obtained. This relationship is later inverted and refined by training an inverse radial basis neural network, allowing calculation of the unknown coefficients and therefore of the potential function. Numerical examples are presented in order to prove the effectiveness of this numerical method.

**key words:** Artificial Neural Network; Radial Basis Function; Coefficients of the Potential Function; Inverse Problems; Eigenvalues of the Schrödinger operator; Finite Element Method.