

# From graphs to neural networks: complexity and simplicity in the framework of mathematics

Martha-Ivon Cárdenas

Universitat Politècnica de Catalunya

## **Abstract:**

In the computer sciences, many mathematical models are obtained to the aim of achieving automatic or machine-made processes that simulate human tasks. But human thinking is very complex, so are the models of Artificial Intelligence (AI). Calculating is very easy for a machine, but recommending an alternative process among several is not. In that sense, the graphs provided an adequate language to visualize those complex AI algorithms. Their great versatility has made them applicable to systems, networks, designs and predictions, being a beautiful example of neural networks at the service of mathematics and a powerful tool to address the organization of complex systems. From metro maps to distributions, from pattern recognition to creating social networks, and from airplane itineraries to image processing, all are great examples of mathematical modeling through graphs.