

Computational Discovery and Experimentation in Mathematics

Ilias Kotsireas

Wilfrid Laurier University, Canada

Abstract

Abstract: In recent years, researchers have been using extensively various computer science technologies, such as artificial intelligence, data mining, high-performance computing, symbolic computation, computer graphics and so forth, as active tools in mathematical research. We will present several of these technologies and their associated tools and methodologies and will illustrate them with examples. This fertile interaction has allowed researchers to formulate conjectures suggested by experiments, put forward hypotheses supported by data and subsequently prove rigorous mathematical results, based on experimentation. We will also describe how this trend materializes in our own research in the area of combinatorial designs.