

Symbolic-Numeric Computation

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There are two types of computation in mathematics: symbolic computation and numerical computation. Symbolic computation manipulates symbols (which may or may not contain numbers) to eliminate the error in the computation. Algebraic tools are mainly used. Numerical computation involves the use of approximations and is inevitably subject to error. The tools are usually derived from analysis. In this talk we will start with the advantages and disadvantages of both computational approaches and how they can be used together. In particular, we will focus on the problem of polynomial root certification. Some symbolic (algebraic) methods can provide certification of the roots of polynomial systems. These roots can be computed very efficiently using numerical methods. They can then be used for practical and critical applications.