Using Numerical Algebraic Geometry to Solve Polynomial Systems

Silviana Amethyst (University of Wisconsin Eau Claire)

Wed 14/10/2020, 15:00 via zoom

The solution of polynomial systems is a critical problem in many areas of science, engineering, and mathematics. Algebraic systems are treated by computational algebraic geometry, a large field including both symbolic and numerical paradigms. Numerical algebraic geometry approaches the problem using numerical techniques and probability-one arguments for providing theoretical algorithmic guarantees. But these guarantees of solution are practically limited, since the precision of computers is finite. As a consequence, the software in this field comes with settings and parameters, and users often benefit from training. To set and control the software effectively, the scientist-user must be minimally familiar with the underlying theory. In this talk, I will give an overview of the major algorithms, and some tips and tricks to help enhance your success. My main focus will be the free software package Bertini, and a few related products.