Título: Randomization, Relaxation, And Complexity In Polynomial Equation Solving

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This volume corresponds to the Banff International Research Station Workshop on Randomization, Relaxation, and Complexity, held from February 28-March 5, 2010 in Banff, Alberta, Canada.

This volume contains a sample of advanced algorithmic techniques underpinning the solution of systems of polynomial equations. The papers are written by leading experts in algorithmic algebraic geometry and touch upon core topics such as homotopy methods for approximating complex solutions, robust floating point methods for clusters of roots, and speed-ups for counting real solutions. Vital related topics such as circuit complexity, random polynomials over local fields, tropical geometry, and the theory of fewnomials, amoebae, and coamoebae are treated as well. Recent advances on Smale's 17th Problem, which deals with numerical algorithms that approximate a single complex solution in average-case polynomial time, are also surveyed.