



istanbul matematiksel bilimler merkezi
istanbul center for mathematical sciences

CERTIFIED HERMITE MATRICES FROM APPROXIMATE ROOTS - UNIVARIATE AND MULTIVARIATE CASE

Agnes Szanto

North Carolina State University

Abstract

Let $f_1, \dots, f_m \in \mathbb{Q}[x_1, \dots, x_n]$ be polynomials with rational coefficients $\in \mathbb{Q}^m[x_1, \dots, x_n]$, and $\mathcal{J} := \langle f_1, \dots, f_m \rangle \subset \mathbb{Q}[x_1, \dots, x_n]$ be the ideal they generate. Assume that we are given approximations $\{z_1, \dots, z_k\} \subset \mathbb{Q}^n[i]$ for the common roots $\{\xi_1, \dots, \xi_k\} = V(\mathcal{J}) \subseteq C$. In this study, we describe a symbolic-numeric algorithm to construct a rational matrix, called *Hermite matrix*, from the approximate roots $\{z_1, \dots, z_k\}$ and certify that this matrix is the true Hermite matrix corresponding to the roots $V(\mathcal{J})$. Applications of Hermite matrices include counting and locating real roots of the polynomials and certifying their existence.

Date : Tuesday, November 19, 2019

Time: 13:30

Place: IMBM Seminar Room, Boğaziçi University South Campus