

Bohemian Matrix Geometry

A Bohemian matrix family is a set of matrices all of whose entries are drawn from a fixed, usually discrete and hence bounded, subset of a field of characteristic zero. Originally these were integers—hence the name, from the acronym **BO**unded **HE**ight **M**atrix of **I**ntegers (**BOHEMI**)—but other kinds of entries are also interesting. Some kinds of questions about Bohemian matrices can be answered by numerical computation, but sometimes exact computation is better. In this paper we explore some Bohemian families (symmetric, upper Hessenberg, or Toeplitz) computationally, and answer some (formerly) open questions posed about the distributions of eigenvalue densities.

This work connects with several disparate areas of mathematics, including dynamical systems, combinatorics, probability and statistics, and number theory. Because the thinking about the topic is so recent, most of the material is still quite exploratory, and this talk will be accessible to students as well as to faculty. Several open problems remain open, and I would welcome your thoughts on them.

This is joint work with several people, including Eunice Y.S. Chan, Leili Rafiee Sevyeri, Neil J. Calkin, Piers W. Lawrence, Laureano Gonzalez-Vega, Dan Piponi, Juana Sendra, and Rafael Sendra.