

Computations with Matrices and Polynomials

SPRING 2020, CSc 87100/CRN 64061, 3 credits.

Fridays 2-4 pm, Room 3308, followed by an optional no credit seminar 4.15-6.15 pm, room 3212.

INSTRUCTOR: Victor Pan, Distinguished Professor, Fellow of the American Math. Society, designated for his “Contributions to the Mathematical Theory of Computation”. An Extended List of Tentative Subjects and Lecture Notes are available upon the request to v_y_pan@yahoo.com; victor.pan@lehman.cuny.edu but in the first weeks of the semester the instructor will *ADJUST THE LIST OF TOPICS TO STUDENTS’ INTERESTS* and will facilitate the study by supplying reading materials.

The course covers mathematical methods for the design and analysis of algorithms for Polynomial, Linear and Multilinear Algebras. In these areas one can reach research challenges much more readily than in classical Mathematics; the course shall encourage students to advance from novice level to research frontiers, journal publications, and PhD defense.

The course introduces the students to research on the **Mathematical Theory of Algebraic and Numerical Computation**. This research can be further advanced in the seminar, but in the past the students from Math Program had succeeded in the seminar even without that introduction.

The instructor has published on these subjects four books with Springer, Birkhaeuser and Elsevier (over 1500 pages overall) and has about 300 other refereed research and survey publications, many of them joint with his present and former students. He currently supports students’ research from his *NSF Grants (\$1,056,291) and PSC CUNY Award (\$11,998)*, but *the students will obtain 3 credits just for successful learning of the course material*.

The subjects at the seminar in the Fall 2019 included solving polynomial equations; Toeplitz, Hankel, Vandermonde, Cauchy and other structured matrices, and hot topics of data compression and low rank approximation of matrices with applications to neural network and machine learning.

