

City University of New York - Graduate School and University Center

CSc 86010 [18240] Topics in Algorithm Analysis and Scientific and Engineering Computing -

Numerical and Algebraic Computation, 3 Credits, Tuesdays, 4.15 – 6.15

Professor Victor Pan

The course is offered for the students from PhD Programs in both Computer Science and Mathematics. It requires no prerequisites. The listed hours are 4.15 - 6.15, but the instructor also arranges regular meetings from 6.30 to 8.30 for the students who prefer these later hours. The room number can be found from the Secretaries in Computer Science and Mathematics or by inquiring the instructor at [V\\_Y\\_pan@yahoo.com](mailto:V_Y_pan@yahoo.com)

The course covers fundamental and advanced subjects in symbolic and numerical computing. Being the basis of modern computations in sciences, engineering, financial mathematics, and signal and image processing, these two fields are prominent in these areas. They are also a constant source of fresh research challenges in both Mathematics and Computer Science.

The specific subjects of the study vary each semester and are adjusted to students' interests. Students have a choice of focusing on learning or research, leading to PhD Theses. They are divided into two groups. The novice students are introduced to Numerical Analysis and Computer Algebra. More advanced students are exposed to research topics in these fields, including very recent, hot and widely open research topics of interest for both Computer Science and Math. Some research challenges are easy to meet and lead to deeper understanding of the field of study.

Besides obtaining three credits, the students engaged in research can be supported from Instructor's NSF Grant and can be led to publications in journal and proceedings and PhD defenses. (In the last 10 years, 10 Theses have been defended under the guidance of this instructor in each of the PhD Programs in Computer Science and Mathematics, and dozens of research papers have been published by his students in leading journals and proceedings of competitive conferences.)

In the previous semester the study included decompositions of general matrices as well as matrices having structures of Toeplitz, Hankel, Cauchy, and Vandermonde types and linked to fundamental polynomial and rational computations in algebra and geometry.

The study is partly based on the instructor's books, available in the GC library and via the internet, and also on his survey papers, supplied as handouts.