

# Matrix Computations and Scientific Computing Seminar

Organizer: J. Demmel and M. Gu

Wednesday, 12:10–1:00 pm, 380 s

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Sep 24      **Gregorio Malajovich**, Universidade Federal do Rio de Janeiro  
*On Self-convexity*

Numerical analysis has a rich story of interplay between two definitions of the condition number: analytic and geometric. The analytic condition number is the norm of the derivative of the solution with respect to the coefficients. The geometric condition number is the reciprocal distance to the set of ill-posed instances. For instance, the Eckart-Young theorem says that for affine equation solving or least squares, those definitions are the same.

Self-convexity is an attempt to encompass some of the convex geometric properties of condition numbers in general. It was motivated by an attack to Smale's 17-th problem, which deals with systems of polynomial equations. However, the results obtained so far are still limited to affine systems.

The objective of this talk is to present the basic ideas, results and motivations. Much of this subject is still wide open, so there may be more questions than theorems.