Pseudospectra for structured matrix perturbations

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A pseudospectrum of a square matrix A is defined as the set of eigenvalues of all matrices of the form A+E, where the norm of the perturbation E is bounded by some constant and E is an element of a given matrix set. Pseudospectra are a well established tool in Systems Theory and Numerical Analysis. After a short introduction to the general theory we discuss pseudospectra for real and Hamiltonian perturbations as well as for coupled linear systems. Another topic will be the relationship between pseudospectra and structured eigenvalue condition numbers. Pseudospectra are a tool for investigating the sensitivity of the eigenvalues of a matrix to perturbations which is used in mechanics, fluid dynamics, Markov chains, and control theory.

Michael Karow obtained his Ph.D. in Mathematics in 2003 from the University of Bremen, Germany. He is Associate Professor and head of the Projectgroup Applied Mathematics at the Technical University of Berlin in Germany. His research area is in numerical analysis, systems and control theory, pseudospectra, perturbation theory of eigenvalues, and linear algebra over quaternions. He has collaborations and held workshops in Europe, Turkey, India, and USA. He also was the head of two educational projects for inovations in mathematics education for the engineering science.

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