MT-619 Advanced Linear Algebra

Vector spaces. Eigenvalues, field of values; Similarity transformations: Diagonalization and Jordan forms over arbitrary fields. Schur form and spectral theorem for normal matrices. Quadratic forms and Hermitian matrices: variational characterization of the eigenvalues, inertia theorems; Singular value decomposition, generalized inverse, projections, and applications; Positive matrices, Perron-Frobenius theorem. Markov chains and stochastic matrices. M-matrices; structured matrices (Toeplitz, Hankel, Hessenberg). Matrices and optimization (e.g. linear complementarity problem, conjugate gradient). Application related topics.