Аннотация

Applied Problems of Linear Algebra

Abstract

In the lecture course, we consider some topics of linear algebra beyond the

standard first year course which are extremely important for applications.

Mostly, these are applications to data analysis and machine learning, as well

as to economics and statistics.

We begin with inversions of rectangle matrices, that is, we discuss pseudo-

inverse matrices (and their connections to the linear regression model). Among

others, we discuss iteration methods (and their using in models of random walk

on a graph applied to Internet search such as PageRank algorithm), matrix

decompositions (such as SVD) and methods of dimension decreasing (with their

connection to some image compression algorithms), and the theory of matrix

norms and perturbation theory (for error estimates in matrix computations). We

plan also to discuss symbolic methods in systems of algebraic equations,

approximation problems, Chebyshev polynomials, matrix functions such as

exponent etc.

We plan to invite some external lecturers who successfully apply linear algebra

in their work. The students are also be invited to give their own talks on

additional topics of applied or theoretical linear algebra.