(Updated) Main Topics of the Final

MATH 102, WINTER 2018

1. LU decomposition.
2. Null space, column space, row space, left null space, rank, nullity.
3. The matrix of linear transformations.
4. Abstract vector spaces and abstract linear maps.
5. Orthogonal complements. Relationships between the four subspaces of a matrix.
6. Orthogonal/orthonormal bases and projections when an orthonormal basis is given.
7. Gram-Schmidt. QR decomposition.
8. Projections onto subspaces. Left inverse. Least squares.
9. Gram-Schmidt for abstract inner product spaces.
10. Determinants and their applications.
11. Similar matrices. Diagonalizable matrices. Powers of matrices and exponentials.
12. Complex vectors and complex matrices. Unitarily diagonalizable matrices. Symmetric, Hermitian, skew Hermitian, unitary, normal matrices.
13. SVD decomposition. Pseudoinverses. Applications to least squares.