Linear Algebra and Analysis in $\mathbf{R}^n$

Instructors: Nikiforos Mimikos-Stamatopoulos and Sebastian Munoz.
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Class schedule: MW 9-10:15 am
Office Hours: W 2:30-4:00 pm.
TA: Antonios Zitridis. OH: M 2:30 - 4:00 pm.

Textbook: Algebra (2nd Edition), Michael Artin, Material will be from Chapters 1,3 and 4. Analysis on Manifolds, James R. Munkres (Chapter 2). We will follow these books primarily, however all the necessary material will be provided on the lectures and there is no need for students to have a copy of any of the books.

Course Description

This course is intended to provide a rigorous background on Linear Algebra and Analysis in $\mathbf{R}^n$.

Course Outline

The following represent the core of the class, however minor additions may be made.

- Matrices: Basic operations, row reduction and determinants.
- Vector Spaces: Subspaces of $\mathbf{R}^n$, general vector spaces, bases and dimension, inner product and computations with bases.
- Linear Operators: Matrix of a Linear Transformation, Eigenvalues/Eigenvectors, characteristic polynomials, orthonormal matrices.
- Differentiation in $\mathbb{R}^n$: Total derivative, continuously differentiable functions, the chain rule, the inverse function theorem, the implicit function theorem.
- Connections between differentiation and integration: fundamental theorem of calculus, integration by parts, change of variables theorem.

Homework

There will be weekly assignments, to be uploaded on Canvas as a pdf file. Homework should be uploaded every Tuesday by 2pm.