

Oregon State University – Department of Mathematics

Qualifying Exam Syllabus (Revised Spring 2018)

Real Analysis:

Metric and normed spaces, including the sequence spaces ℓ_p . Continuity, uniform continuity, spaces of continuous functions. Completeness and applications including Banach fixed point theorem. Convergence of sequences of functions. Compactness, including Arzela-Ascoli theorem.

Some topics from undergraduate real analysis which are supposed to be known and may be used for examples include: topology of \mathbb{R}^n ; differential calculus, including (Frechet) differentiable functions on \mathbb{R}^n ; inverse/implicit function theorems; Riemann integration; countable and uncountable sets.

References:

- N. Carothers: *Real Analysis*, (Cambridge U. Press)

Linear Algebra:

Systems of linear equations, matrices and matrix operations, determinants. Abstract vector spaces, bases, dimension. Inner product spaces. Linear transformations, eigenvalues, diagonalization. Minimal and characteristic polynomials. Jordan canonical form. Spectral theorem in finite dimensions.

References:

- Friedberg, Insel, Spence: *Linear Algebra*, (Prentice-Hall)
- Hoffman and Kunze: *Linear Algebra*, (Prentice-Hall)