Math 617 Functional Analysis

Spring 2024, UAF

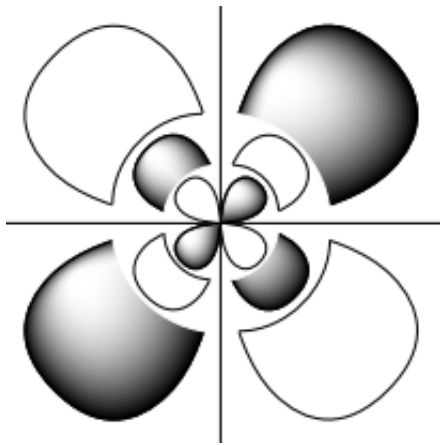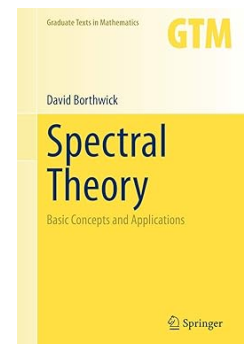*instructor:* Ed Bueler
　　　　elbueler@alaska.edu

course website: bueler.github.io/fa/

textbook: D. Borthwick, *Spectral Theory: Basic Concepts and Applications*, Springer 2020

prerequisites: linear algebra, undergrad/grad real analysis, exposure to complex analysis

CRN: 35367 (in-person)
　　　35378 (sync zoom)

room & time: Chapman 107
　　　MWF 2:15–3:15 pm

Functional analysis is about infinite-dimensional vector spaces—spaces of functions—and their linear maps. It is the mathematical home of partial differential equations, boundary value problems, quantum mechanics, the finite element method, field theories, fluid mechanics, and signal processing.

This course should appeal to students interested in the mathematics of quantum mechanics and/or partial differential equations. Mathematically-inclined students from the sciences and engineering are encouraged to attend, as are graduate students in mathematics looking for an elective with practical relevance.

While the course is delivered hybrid, in-person attendance is recommended!

Topics:

- Hilbert spaces
- Riesz representation theorems
- Sobolev spaces (light)
- self-adjoint operators: compact, bounded
- unbounded operators
- spectral theorem
- Laplacians and Hamiltonians
- axioms/concepts of quantum mechanics