MATH 7310: REAL ANALYSIS AND LINEAR SPACES I

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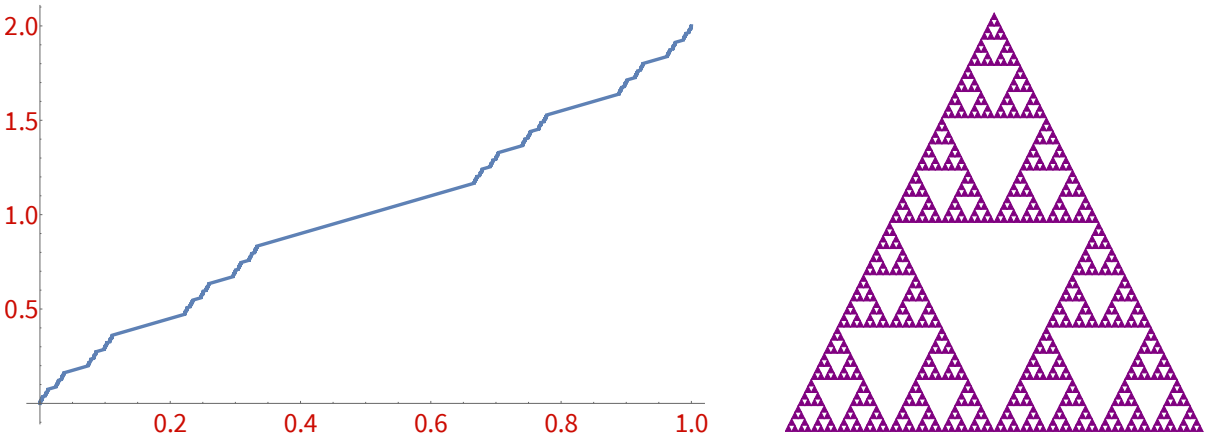
1. *Graduate real analysis*

This course introduces students to fundamental analytic tools used across all of mathematics:

- Measures, including the Lebesgue measure on the line
- Lebesgue integration
- L^p and Hilbert spaces
- Absolute continuity, differentiation of measures

Additional topics included in the course will range from applications to probability (e.g., theory of conditional expectations, Gaussian measures and Gaussian Free Field, ...) to selected topics from classical analysis (orthogonal polynomials, numerical methods, steepest descent, ...), as time permits. Students' suggestions of additional topics are very welcome.

A central technical skill which you will develop is mathematical writing and presentation of ideas. This goal is reflected in write-up tasks and in grading of homeworks and midterms.



Left: The cantor ladder plus x, an important counterexample in the course.
Right: The Sierpinski triangle, a fractal set whose area you will be able to compute.

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An up to date syllabus is always on `GitHub` at https://github.com/lenis2000/Syllabi/blob/master/Syllabus_7310_s20.pdf. For direct PDF download use `this link`. LaTeX source with *changes* to the syllabus is `here` (click "History").
Note that this PDF has green clickable links.