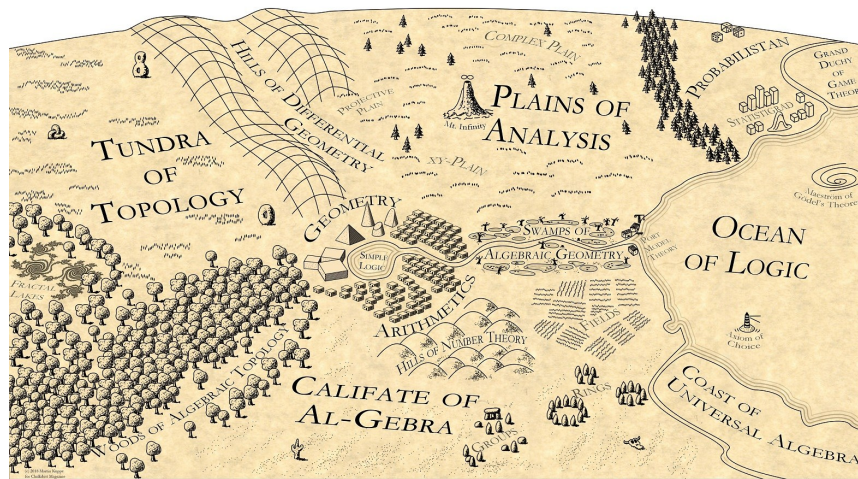


Math 598, Introduction to Categories and Schemes

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Categories lead to a great way of thinking, giving us a bird's eye perspective to unify concepts from different fields of mathematics and beyond. 'Mathematicians lived in caves before they invented categories' says Stanford mathematician B. Conrad, and category theory is exciting programmers these days as a way to write elegant and maintainable code.

In this course, we will explore categories and how they revolutionized our thinking by liberating us from the confines of set theory, resolving e.g. Russell's paradox among other things. We will apply these ideas to introduce the theory of schemes in the simplest case, the context of curves. Schemes are a way to create geometry from algebra, dating back to Grothendieck's school from the mid-20th century. The picture below shows the scheme of the ring of integer polynomials, $\mathbb{Z}[x]$.

Prerequisites: A good grasp of undergraduate algebra. Note that the course 'Algebraic Curves' is not a prerequisite.

Textbook: Selections from Ravi Vakil's 'The rising sea: Foundations of Algebraic Geometry.'

