Complex Dynamics

The presentation presentation

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The assignment

We will have class presentations April 22, 24, 26, and (probably) 29. That's two a day so we're shooting for about 20 minutes.

Obviously, you'll present on a topic within complex dynamics and I'm open to student initiative.

There will *not* be a separate paper required. The presentation itself, however, should be prepared with LaTeX - like this very presentation! You'll turn in that LaTeXed document.

Let's flip on through for more on all of that.

Technical requirements

- Your presentation should be prepared using LaTeX and Beamer.
  - Beamer is a great LaTeX package for generating PDF files that display as presentations. Some resources include:
    - ★ Overleaf's tutorial
    - ★ The source code for this presentation
- You'll need to incorporate some images as well. For this purpose, you may use
  - Any of the tools on my visualization webpage.
  - Mathematica
  - Python
  - Anything else (though, I may or may not be able to help)

Potential topics

Again, I'm open to student initiative but I've got are some suggestions.

For example, one possibility would be to focus on a particular family of functions. This would almost certainly involve generating and using a parameter space image.

Potential topics continued - Families of functions

- Polynomial families
  - The logistic family: $\lambda z(1-z)$
  - The multibrots $z^p + c$.
- Rational families
  - The negabrot: $z^{-2} + c$
  - $z^p + c/z^q$
- Transcendental families
  - The exponential family λe^z
  - The cosine family $c\cos(z)$
  - Inversion of the tangent function $\tan(z) = w$

More potential topics

- Inverse iteration
- Neutral fixed points
- The complex Collatz function
- Newton's method applied to the sine or cosine
- Non fixed periodic basins for Newton's method - try, for example, $f(z) = z^5 - z - 1$
- Iteration on the Riemann sphere

Note that I might choose to talk about one or more of these topics so let me know of your interest soon.