

THE GRADUATE STUDENT SECTION



Graduate Student Blog

by and for math graduate students



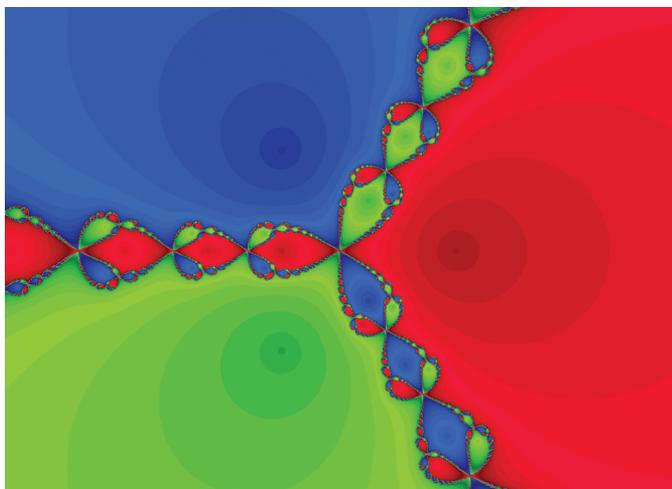
The AMS Graduate Student Blog, by and for math graduate students, includes puzzles and a variety of interesting columns. *January 2016 posts include "The Academic Job Search IV: Negotiating an Offer", an interview with number theorist Leo Goldmakher, and those sampled below.*

blogs.ams.org/mathgradblog.

Visualizing Newton's Method

by djbruce, University of Wisconsin

...One of the topics commonly covered in a first or second semester of calculus is the use of Newton's method to approximate roots of functions.... When I've taught Newton's method, I tried to stress that this method is not guaranteed to always work and can be fairly sensitive to the initial condition.... One way to visualize some of these complexities is via a cool program called FractalStream. FractalStream takes each point in the complex plane and iterates it under the given map until the sequence seems to stop. It then colors that initial point depending on where the sequence of iterates ended.



Notice that while there is a large area round each root in which Newton's method converges quickly to that root the areas sort of between each root show more complex behavior. In particular, in this region we see just how sensitive to the initial condition Newton's method becomes....



djbruce is a second-year graduate student at the University of Wisconsin.

Matrices and MLK Day

by Matthew Simonson

In February 2013, the *Wall Street Journal* reported, "Prison sentences of black men were nearly 20% longer than those of white men for similar crimes in recent years...". Is this evidence of racism, intentional or subconscious, on the part of judges? ...that is what we will try to suss out here using matrix multiplication.... I'm not claiming that you can fully explain racial sentencing disparities in one lesson, [but] there is plenty of room in the curricula of introductory college math courses to tackle race, class, and social justice. And indeed, there is no excuse to stand on the sidelines in an age of such inequality and injustice. Many math, science, and engineering students badly need to be exposed to the reality of these inequities, and what better a place than in a course that they value, in a context they find engaging? Students from other disciplines merely trying to fulfill their quantitative requirement might suddenly find that math is important to the world they live in and the values they hold. Moreover, both types of students will learn how math can serve as a valuable tool for fighting injustice....

Matthew Simonson is a first-year Network Science doctoral student at Northeastern University in Boston and Editor-in-Chief of the Graduate Student Blog.

