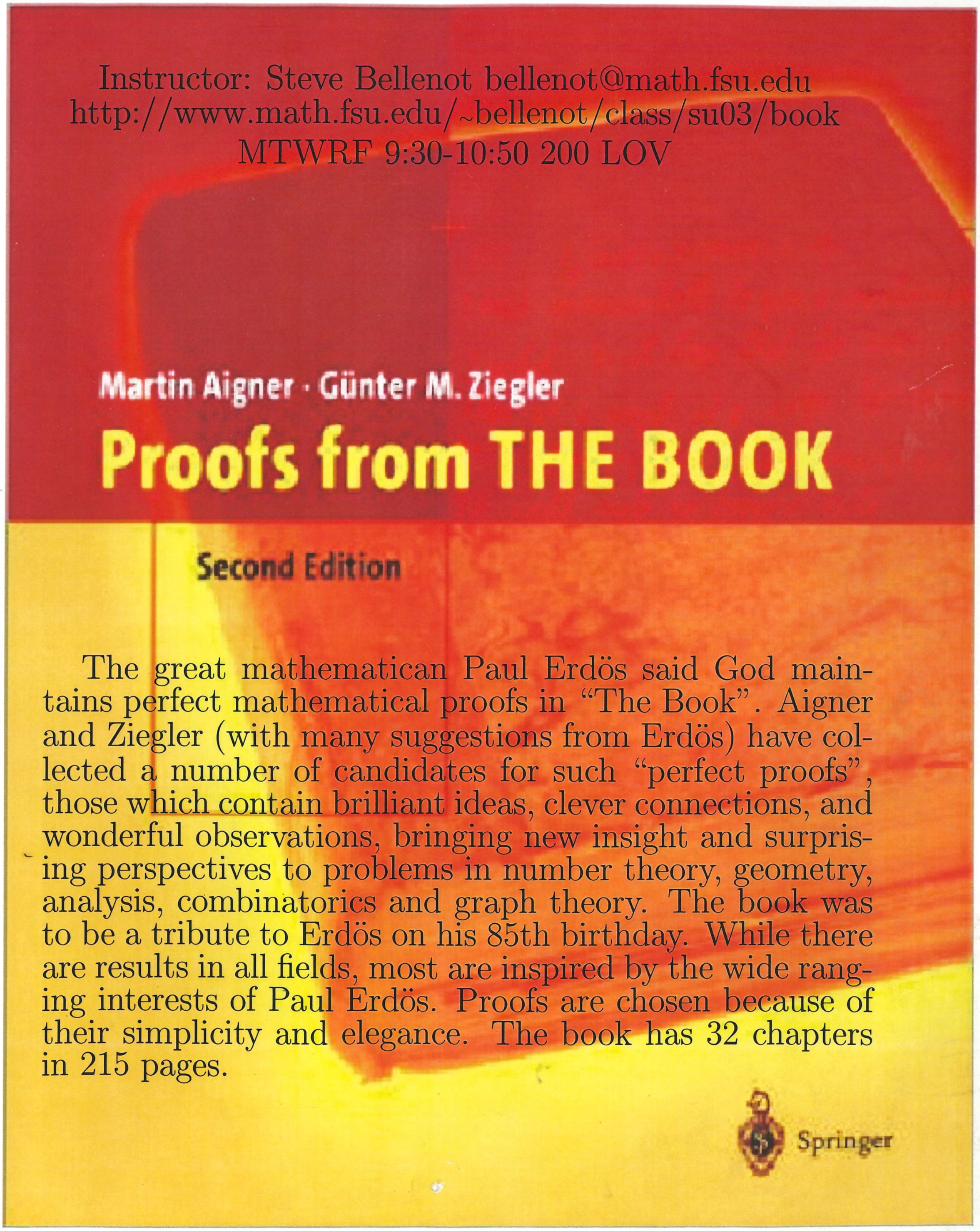
A Summer Course for the 'B' Term
MAT 5932-24 Proofs from The Book

Instructor: Steve Bellenot bellenot@math.fsu.edu
http://www.math.fsu.edu/~bellenot/class/su03/book
MTWRF 9:30-10:50 200 LOV

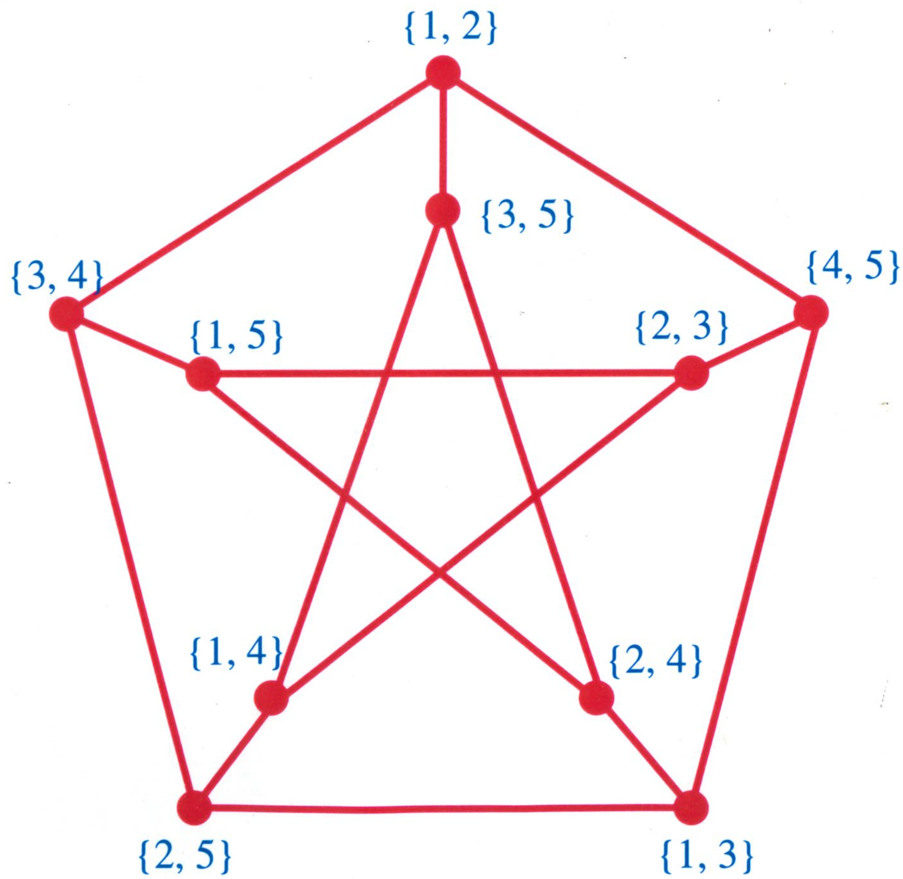


The great mathematican Paul Erdös said God maintains perfect mathematical proofs in "The Book". Aigner and Ziegler (with many suggestions from Erdös) have collected a number of candidates for such "perfect proofs", those which contain brilliant ideas, clever connections, and wonderful observations, bringing new insight and surprising perspectives to problems in number theory, geometry, analysis, combinatorics and graph theory. The book was to be a tribute to Erdös on his 85th birthday. While there are results in all fields, most are inspired by the wide ranging interests of Paul Erdös. Proofs are chosen because of their simplicity and elegance. The book has 32 chapters in 215 pages.

MAD 5305-01 Graph Theory Fall 2003

Instructor: Steven Bellenot bellenot@math.fsu.edu
http://www.math.fsu.edu/~bellenot/class/f03/graph
TR 11:00-12:15 103 CAR

Graph theory is cool.



Petersen Graph -- {u, v} adjacent to {s, t} <=> the sets are disjoint

MAT 4931-03 Scientific Computing Spring 2004

Instructor: Steven Bellenot bellenot@math.fsu.edu
http://www.math.fsu.edu/~bellenot/class/s04/sci
TR 9:30-10:45 302 MCH

This is not another numerical class, but rather preparation for doing an internship at a national laboratory or other scientific job with a computing component. The course covers a collection of computing tools that one is assumed to know, or it is assumed that you will learn on your own time. The topics are geared towards the Mathematical student, see the course web site for the list of topics.

Prerequires: some math and some computer science. For the math, say linear algebra or ordinary differential equations. From the computer science, say a high level programming language such as C, Java or Fortran and some additional computer science class. See Bellenot if you have questions about the prerequisites.

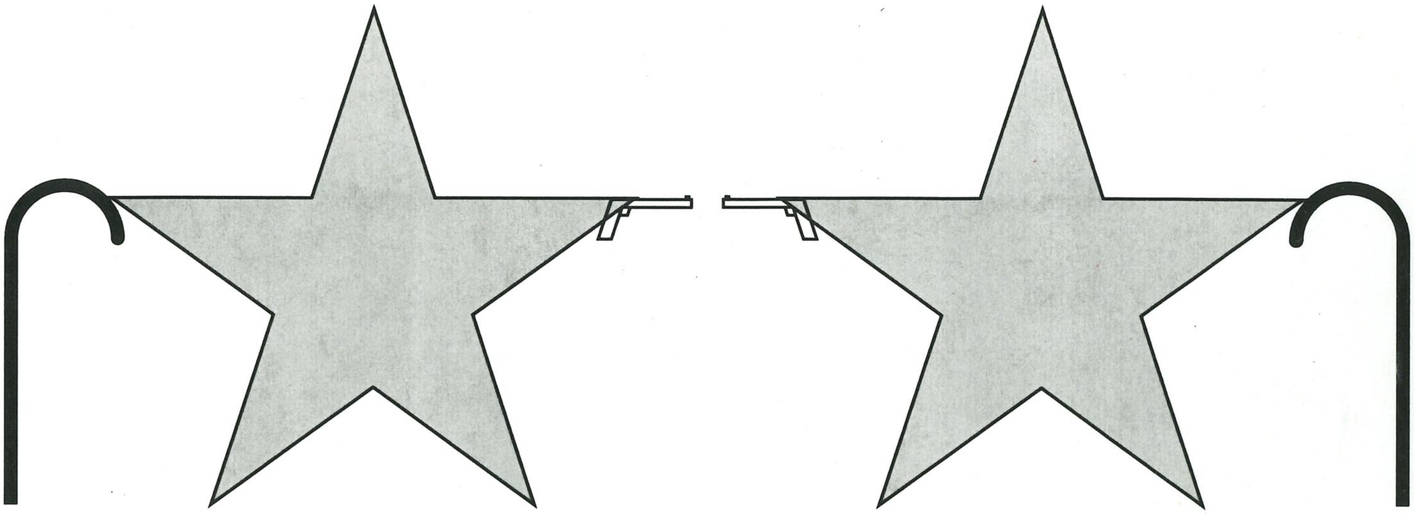
Trump, the monster.com (get a monster job) monster.

Bellenot has worked as a mathematican both at a national laboratory (JPL) and as an consultant to several companies both large and small.

A Course for Fall 2005

MAA 6416-01 Functional Analysis

Instructor: Steve Bellenot bellenot@math.fsu.edu
http://www.math.fsu.edu/~bellenot/class/f05/fun/
MWF 10:10-11:00 (MW in 107 LOV, F in 112 MCH)



Pictured: *Weak Star Dual*, adapted from E. Rumsey's *A Liberal Arts View of Math*

Duality is one of the themes of Functional Analysis, X^*, the dual space of X, is the vector space of all (continuous) linear functionals from X to the scaler field ($\mathbb{R}$ or $\mathbb{C}$). There is a topology one can put on X^* called the weak-star topology, which has the advantage of having large compact sets.

- This is an introductory analysis class for both pure and applied math students and has only an Advanced Calculus prerequisite (or permission of the instructor).
- Functional Analysis takes its name because it studies (∞-dimensional) spaces of functions and the linear operators between them.
- For textbooks see the web page above (no other class has two textbooks with a total under $30)
- Topics:
  - applications to differential equations
  - duality of norm spaces and operators, in particular Hahn-Banach, Open mapping and the principle of uniform boundedness.
  - basic introduction to generalized functions (distributions)
  - spectral theory for compact operators on a Banach space

A Summer Course for the 'C' Term

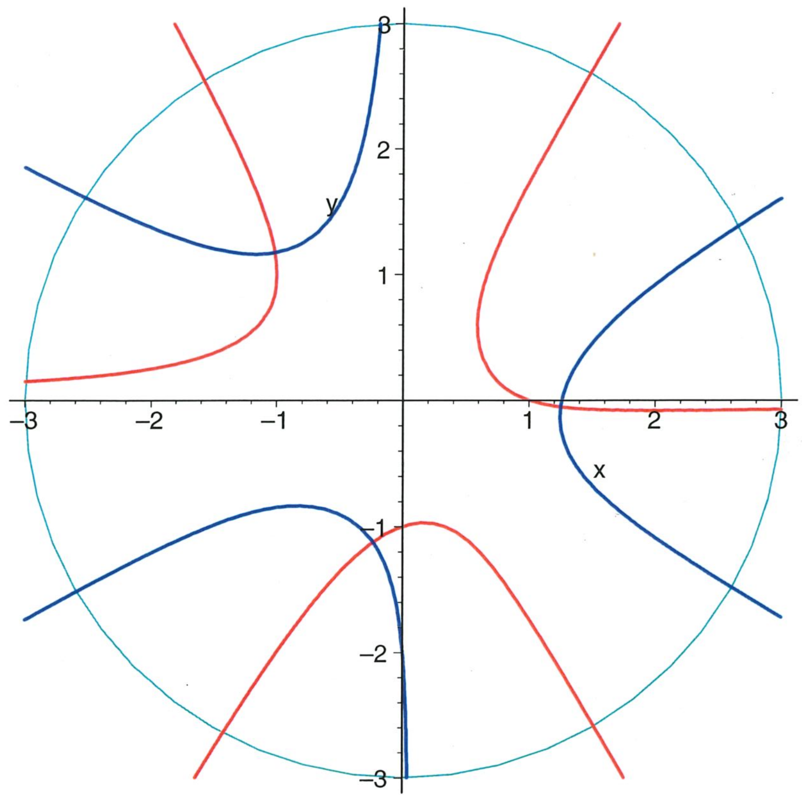
MAA 4402-01 Complex Variables

(also listed as MAT 5933-07)

Instructor: Steve Bellenot bellenot@math.fsu.edu

http://www.math.fsu.edu/~bellenot/class/su04/complex/

MTWRF 9:30-10:50 106 LOV



Complex variables is an introduction to the analysis of functions of a complex variable $z = x+iy$. Ironically, complex analysis is often easiler then non-complex analysis; and imaginary numbers are no less real than real numbers. There is tremendous power in complex analysis because of the number of ways to view the same property.

The picture illustrates Gauss's proof of the fundemental theorem of algebra – every polynomial has a complex root. The picture shows the inverse images of $\Re = 0$ and $\Im = 0$ for the polynominal $z^3 + iz - 2 - i$. The green circle is chosen far enough out so the z^n term dominates. The the pattern of red and blue lines represent the points mapped to the real and complex axes respectively. The intersections (which are required by the immediate value theorem) are zeros of the polynomial.

A Summer Course for the 'C' Term

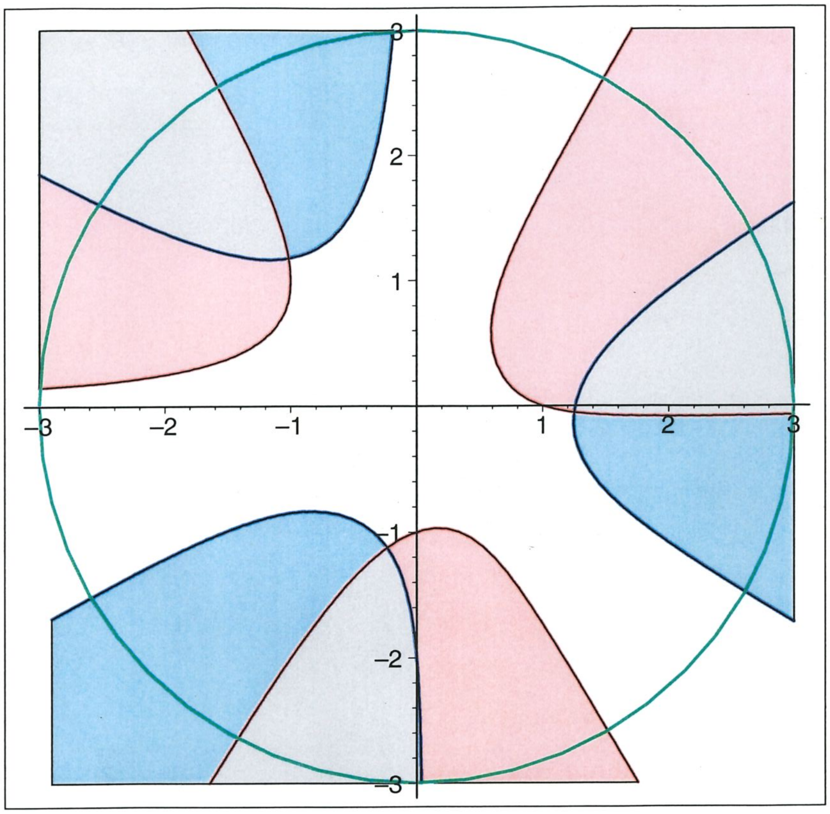
MAA 4402-01 Complex Variables

(also listed as MAT 5933-07)

Instructor: Steve Bellenot bellenot@math.fsu.edu

http://www.math.fsu.edu/~bellenot/class/su04/complex/

MTWRF 9:30-10:50 106 LOV

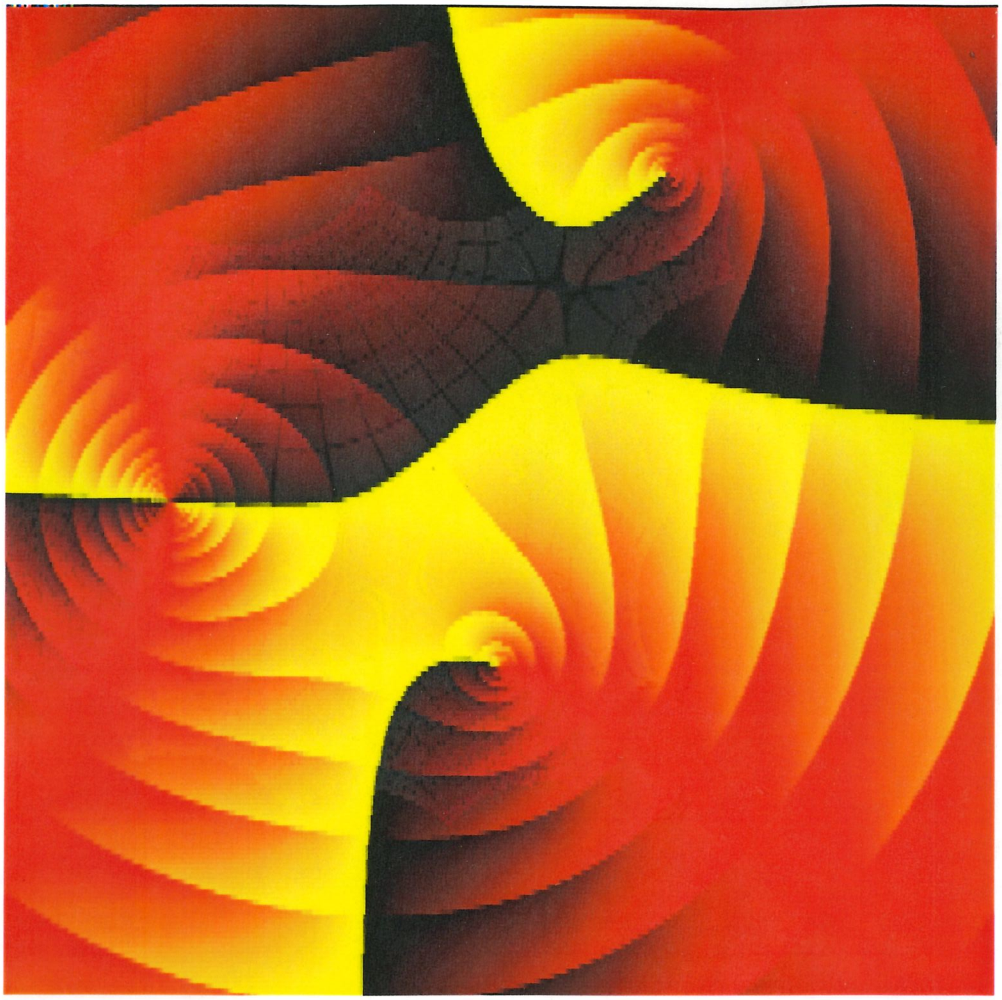


Complex variables is an introduction to the analysis of functions of a complex variable $z = x+iy$. Ironically, complex analysis is often easiler then non-complex analysis; and imaginary numbers are no less real than real numbers. There is tremendous power in complex analysis because of the number of ways to view the same property.

The picture illustrates Gauss's proof of the famous fundemental theorem of algebra. (Every polynomial has a complex root.) The picture shows the inverse images of $\Re \geq 0$ (pink) and $\Im \geq 0$ (blue) for the polynominal $z^3+iz-2-i$. The green circle is chosen far enough out so the z^n term dominates. The the pattern of red and blue lines represent the points mapped to the real and complex axes respectively. The intersections (which are required by the immediate value theorem) are zeros of the polynomial.

MAA 4402-01 Complex Variables

Instructor: Dr Steven Bellenot bellenot@math.fsu.edu TR 2:00-3:15 107 LOV
http://www.math.fsu.edu/~bellenot/class/s06/complex/



Complex variables is an introduction to the analysis of functions of a complex variable $z = x + iy$. Ironically, complex analysis is often easiler then non-complex analysis; and imaginary numbers are no less real than real numbers. There is tremendous power in complex analysis because of the number of ways to view the same property.

The picture illustrates "domain mapping" of the fourth degree polynomial $f(z) = (z+2)^2(z-1-2i)(z+i)$ drawn on the square with corners $\pm 3 \pm 3i$. The image on the bottom is the reference picture while the image on the top colors the point z with the color at the point $f(z)$ in the reference picture. Note the difference between the double root at z =-2 compared to the single roots at $1 + 2i$ and $-i$. (Graphics by Hans Lundmark.)