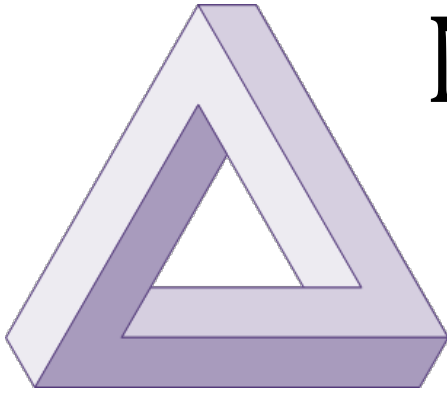


TCU Math Newsletter



Pure mathematics is the world's best game. It is more absorbing than chess, more of a gamble than poker, and lasts longer than Monopoly. It's free. It can be played anywhere - Archimedes did it in a bathtub.

- Richard J. Trudeau, Dots and Lines

Professor Susan Staples wins Texas MAA Teaching Award

The Texas Section of the Mathematical Association of America named Professor Susan Staples of the TCU Mathematics Department as the 2014 recipient of the Distinguished College and University Teaching of Mathematics Award. The award is given each year to one professor in the state of Texas. It will be presented to Dr. Staples at the Texas Section meeting of the MAA in Laredo, Texas on April 4, 2014.

Congratulations Dr. Staples!

Frank Stones Memorial Colloquium Talk on February 7

Dr. David Weinberg of Texas Tech University will present the talk "Classification of Problems in Real Algebraic Geometry" in TUC 246 at 3:30 pm on Friday, February 7. Refreshments will be served before the talk in TUC 300.

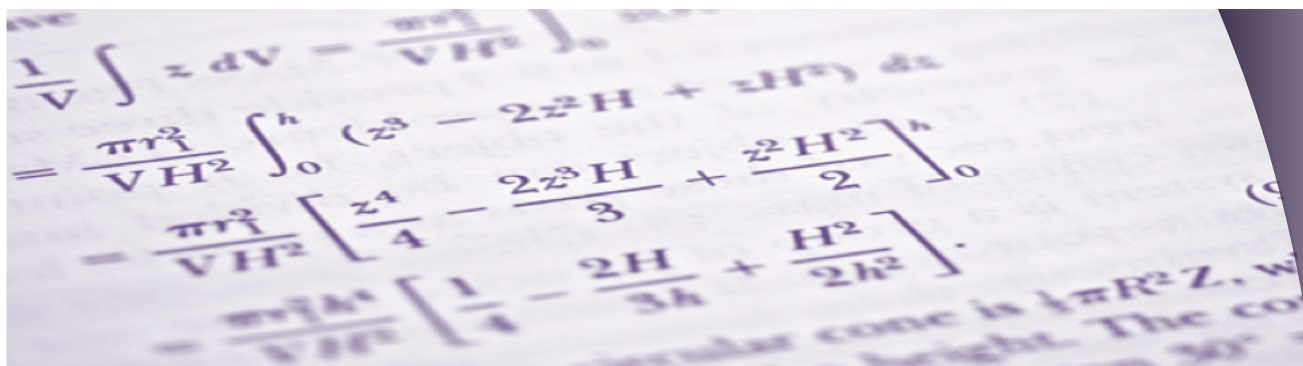
This talk will survey many classification problems in real algebraic geometry. It will focus on the definitions of the equivalence relations. A wide variety of results will be described for both global and local questions. After providing this background, an infinite supply of open problems of unimaginable complexity can be easily described.

Texas Undergraduate Topology and Geometry Conference

The second annual Texas Undergraduate Topology and Geometry Conference. (TeXTAG) will be held on February 21-23, 2014 at the University of Texas at Austin. The conference is intended to give undergraduates working in topology and geometry a chance to present their work, and to give math undergraduates from Texas and neighboring states a chance to network, learn some math, and think about next steps.

The conference will feature two outside speakers: Dr. Rob Kusner from the University of Massachusetts, and Dr. Erica Flapan from Pomona College. There will likely be panel discussions on subjects such as graduate school and teaching. The conference will begin with a reception on Friday evening, and end around noon on Sunday.

For more information and to register, see the conference webpage: math.utexas.edu/conferences/textag. Funding for accommodations and travel is expected to be available for a majority of participants from Texas and adjacent states.



Solution to the January 2014 Problem of the Month

Problem: Alice and Bob play the following game, taking alternating turns, with Alice playing first. The playing area consists of $n > 1$ spaces, arranged in a line. Initially all spaces are empty. At each turn, a player either (1) places a stone in an empty space, or (2) removes a stone from a nonempty space s places a stone in the nearest empty space to the left of s (if such a space exists), and places a stone in the nearest empty space to the right of s (if such a space exists). The first player to leave a single empty space loses. Prove that the game always ends after finitely many turns.

Solution: For a position P , define a function by
 $f(P) = (1 + \# \text{ of occupied spaces}) \cdot n$

- (# of consecutive occupied spaces at the beginning of the line)
- (# of consecutive occupied spaces at the end of the line).

Then the game begins with $f=0$ and f is clearly less than n^2 . Moreover, each turn either increases the number of stones or keeps the number of stones the same while decreasing the total number of occupied spaces at the ends of the line. Thus, as the game is played, the values of f are a strictly increasing sequence of integers, so the game must end within finitely many turns.

February 2014 Problem of the Month

This month's problem was inspired by a problem transmitted by Dennis Ledis. Find the smallest integer greater than 10,000 whose base 3 and base 5 representations consist only of 0s and 1s. (The smallest examples greater than 1 are $30=110_5=1010_3$ and $31=111_5=1011_3$.)

Students and others are invited to submit solutions to Dr. George Gilbert by e-mail (g.gilbert@tcu.edu) or hard copy (Math Dept. Office or TCU Box 298900). Correct solutions submitted by persons who are not members of the TCU math faculty will be acknowledged in the next issue of the newsletter. Note that a correct solution is an answer and a justification of its correctness. The solution to the problem will be published in the next edition of the newsletter.

Editor: Rhonda Hatcher
 Problem Editor: George Gilbert
 Thought of the Month Editor: Robert Doran