

MATH RESEARCH WEEKEND

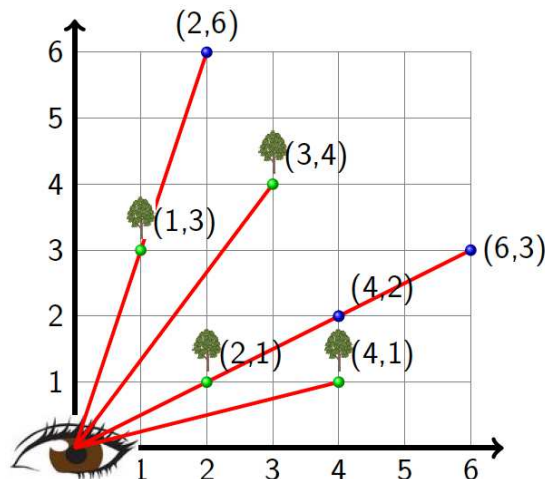
January 26-27, 2018

Department of Mathematics, SUNY Geneseo

Dr. Pamela E. Harris, Williams College

Title: Invisible Lattice Points

Description: A point $(x, y) \in \mathbb{N}^2 = \mathbb{N} \times \mathbb{N}$ is said to be **invisible from the origin** if there exists an integer $c \geq 2$ that divides both x and y , that is, $\gcd(x, y) > 1$. If (x, y) is invisible from the origin and c is the largest integer dividing both x and y then the point (x, y) is blocked by the point $(\frac{x}{c}, \frac{y}{c})$ when viewed from the origin along the line-of-sight from $(0,0)$ through (x, y) . For example, the point $(6, 3)$ is invisible from the origin since it is blocked by $(\frac{6}{3}, \frac{3}{3}) = (2, 1)$, see figure below.



Natural questions that arise are the following:

- (i) What is the proportion of points in \mathbb{N}^2 that are invisible from the origin?
- (ii) Within the points that are invisible from the origin, are there arbitrarily large patches of hidden points? And how can we find them?
- (iii) How do the answers to these questions change when we consider more general *curves-of-sight*?
- (iv) How about considering points in \mathbb{N}^d for $d \geq 3$?

Come and join Dr. Pamela Harris in this year's MATH RESEARCH WEEKEND (MRW) to learn about invisible lattice points and get some experience with what mathematical research is all about.

Pre-Requisites: Students should have completed MATH 239 (Intro to Proof) with a C- or better.

To apply go to www.geneseo.edu/math and look for the link to the online application (Deadline is Jan 24)

Program Schedule:

Friday, January 26

- (i) 2:30-3:30 pm: Colloquium Talk in Newton 214, Title: *Invisible Lattice Points*
- (ii) 4:00-4:30 pm: Pizza dinner (South 336)
- (iii) 4:30-7:00 pm: First session (South 336)

Saturday, January 27 in South 336

- (i) 9:00-11:59 am: Second session
- (ii) 12:00-1:00 pm: Lunch
- (iii) 1:00-4:00 pm: Third session