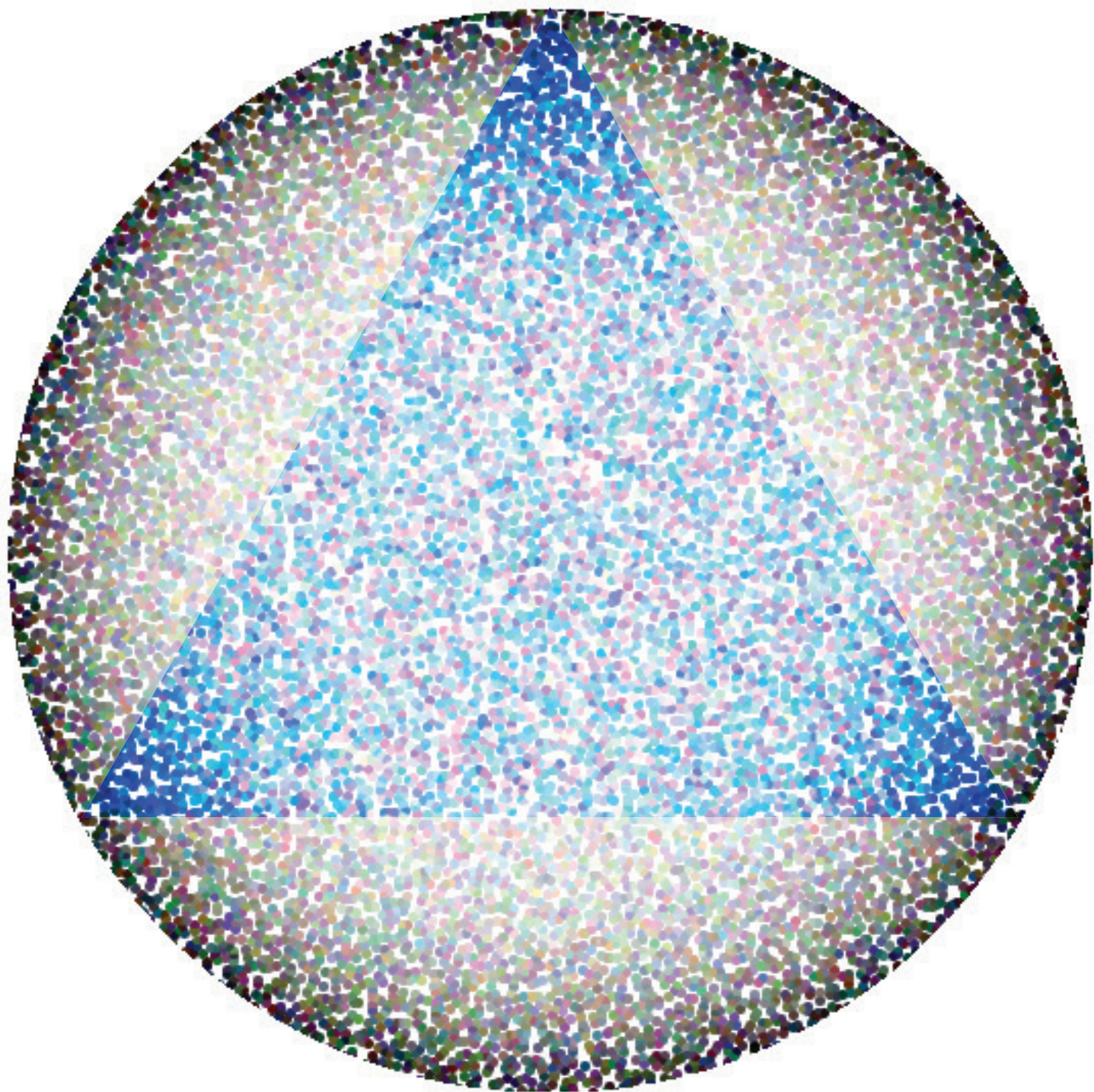




Fall 2013 G. Milton Wing Lecture Series

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Online Instruction and Random Triangles

Monday, Oct. 14 • 5–6 p.m.
Goergen Hall, Room 101

Abstract: The use of the World Wide Web to deliver college course content ranges from simply making homework sets available all the way to teaching Massive Open Online Courses (MOOCs).

I will talk about the “online revolution,” the arrival of MOOCs, and what this could mean for all of us in higher education—faculty and students alike. I will describe my experiences using online video lectures for the Linear Algebra class at MIT (ocw.mit.edu), present a few minutes of one lecture, and open a discussion about how it could be improved. For the mathematical subject of the lecture, we will ask the innocent question:

Is a random triangle likely to be acute or obtuse? This leads to an understanding of the “space” of all triangles.

Tridiagonal Matrices: Their Exponentials and Completions

Tuesday, Oct. 15 • 3:30–4:30 p.m.
Lattimore Hall, Room 201

In applications of linear algebra, an important role is played by—tridiagonal—matrices, for which the only nonzero entries are on the diagonal and its two neighboring off-diagonals.

A key example is the *second difference* matrix K , which is tridiagonal with entries $-1, 2, -1$ down its diagonals. K is important for solving the wave equation and the heat equation. Its pivots, eigenvalues, and eigenvectors are known. In principle we know K ’s positive definite square root and its matrix exponential, but in fact we can understand them even better. A different question is to complete that matrix K so that the determinant (the entropy) is as large as possible. Beautifully, that completion of K produces a tridiagonal inverse.

