

MANY CHEERFUL FACTS

presents

Homotopical Syzygies

a talk by James Kelley

11:10 am - 12:00 on Wednesday, April 12th, in room 1015.

Most texts on algebraic K -theory give explicit definitions for K_0 , K_1 and K_2 of a ring R and leave the higher K groups up to heavy machinery. In his doctoral thesis, Kiyoshi Igusa described a method of drawing elements of $K_3(R)$ in the plane. His work reduced the computation of the third homology group of something bad or the third homotopy group of something worse to a problem that can be tackled with crayons. I will describe the mathematics behind this simplification and demonstrate its usefulness by drawing generators of $K_3(\mathbb{F}_q)$ for certain values of q . Attendees with at least 7 different-colored crayons may walk away with a cheerful bit of K -theory to affix to the refrigerator. No knowledge of crayons is assumed or required.

*I am the very model of a modern Major General,
I've information vegetable, animal, and mineral,
I know the kings of England, and I quote the fights historical
From Marathon to Waterloo, in order categorical;
I'm very well acquainted, too, with matters mathematical,
I understand equations, both the simple and quadratical,
About binomial theorem I'm teeming with a lot o' news,
With many cheerful facts about the square of the hypotenuse!*

- Gilbert & Sullivan $P \circ P$