MANY CHEERFUL FACTS

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Representability by Sums of Squares

a talk by Steven Sam

12:10–13:00 on Wednesday, March 5, in Evans 1015.

A famous theorem of Lagrange asserts that every positive integer can be written as the sum of four squares. He also classified those positive integers that can be written using only three squares, but it wasn't until Gauss that a complete proof arose. I will prove Lagrange's theorem via the geometry of numbers, and if time permits, discuss the three square classification and the two square classification.

> *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, $P \circ P$

The website for Many Cheerful Facts is
`http://math.berkeley.edu/~mcf/`