

CALIFORNIA STATE UNIVERSITY, LONG BEACH

THE MATHEMATICS COLLOQUIUM

presents

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speaking on

"Finite Subgroups of the Quaternions"

Friday April 20, 2007

12:00noon - 1:00PM

FO3-200A

Abstract:

Question: Given a field, what interesting finite multiplicative subgroups does it have?

Answer: None. We learn in algebra class that any finite subgroup of a field is cyclic.

However, division rings (noncommutative fields) are much more interesting. At the very least, we know that the quaternions contain the finite quaternion group $\{1, -1, i, -i, j, -j, k, -k\}$, which is not cyclic. Lots of interesting geometry gives us a classification of all finite subgroups of the quaternions. They correspond to subgroups of $SU(2)$ and $SO(3)$, which correspond in turn to rotation groups of the Platonic solids.

If you know basic group theory, you'll be able to understand the talk. Knowing the definitions of $SU(2)$ and $SO(3)$ would help, but we'll review them as we go along.