Department of Mathematics and Computer Science

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Friday, April 10, 2015, 4:10 pm

COLLOQUIUM TALK

Speaker: Gregory Galperin

Old Main 2231

How to Construct the Sum of Relativistic Velocities by Straightedge?

Abstract:

Unlike the Newtonian *commutative* addition of velocities, the relativistic –Einstein– addition of velocities is *non-commutative.* For example, $u \bigoplus c = c$ for any velocity u, where c is the speed of light, the maximal possible speed in nature. The Newtonian velocity space is Euclidean and the Einstein velocity space is Lobachevskian (hyperbolic), so the addition of relativistic velocities obeys rules of hyperbolic geometry $\mathbf{H}^2$.

A simple geometric construction for the relativistic sum $u \bigoplus v$ can be done in the Klein model $\mathbf{K}^2$ of hyperbolic geometry by using only a straightedge. This construction is based on the so-called "**zig-zag**"-construction of congruent hyperbolic segments in $\mathbf{K}^2$, and on the notion of the cross-ratio of four points.

SNACKS IN FACULTY LOUNGE AT 3:30 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)

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