Department of Mathematics and Computer Science

Friday, February 6, 2015, 4:10

COLLOQUIUM TALK

Speaker: Gregory Galperin
Department of Mathematics and Computer Science, EIU

Old Main 2231

“Median” Theorem in Three Geometries

Abstract:

The famous Euclidean ($\mathbb{E}^2$) “median” theorem states that the three medians of a Euclidean triangle are concurrent: they meet at one point G which splits each median in the constant ratio $2:1$ from the respective vertex of the triangle. The constant ratio $2:1$ plays the fundamental role in the proof of that theorem.

Unfortunately, there is no such a <u>constant</u> ratio for spherical ($\mathbb{S}^2$) and hyperbolic ($\mathbb{H}^2$) geometries and thus the Euclidean median-proof of concurrency fails in both cases. However, the fundamental and inspiring Bolyai’s idea on the substitution of segments by respective circumferences can be involved into consideration and leads to the aim.

In my talk, I will give a geometry-independent proof of the “median” theorem for $\mathbb{S}^2$ and $\mathbb{H}^2$, which also gives another proof for the standard Euclidean ($\mathbb{E}^2$) “median” theorem. The proof involves some, but not many, formulas of different kind from spherical and hyperbolic geometries.

If the time allows, I will give another, very short and absolutely pictorial, proof of the “median” theorem for a hyperbolic triangle in the frame of the Klein model $\mathbb{K}^2$ of hyperbolic geometry; this proof does not contain any formula at all!

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