Brownsville seminar

The University of Texas Rio Grande Valley
School of Mathematical & Statistical Sciences

GAUSS CIRCLE PROBLEM OVER SMOOTH INTEGERS

Speaker: Ankush Goswami

Abstract:

A classical problem in mathematics, the *Gauss circle problem* is to determine how many integer lattice points are inside a circle of radius $\sqrt{x}$ $(x > 0)$ centered at the origin. In other words, it is the estimate of the number of points in $N(x) := \{(a,b) \in \mathbb{Z}^2 : a^2 + b^2 \leq x\}$, and Gauss showed that $|N(x)| \sim \pi x$, so the real problem is to accurately bound the error term describing how the count of (lattice) points differs from the area of the circle. In this talk, we consider a variant of the circle problem wherein we consider only those lattice points $(a,b) \in N(x)$ such that $a^2 + b^2$ is y-*smooth* where $0 < y \leq x$. If we denote the set of such points by $N(x,y)$, then we show that $|N(x,y)| \sim \rho(\alpha)\pi x$ where $\alpha = logx/logy$, and $\rho(\alpha)$ is the Dickman function satisfying a delay-differential equation. We will show that this result is uniform in y over a certain large range. If time permits, I will discuss a generalization of the circle problem by introducing a new function and obtain certain estimates following a method of Selberg.

Cookies and Coffee will be provided!

Time: 1:30-2:30 pm, November 3, 2023

Location: BLHSB 1.316 and in

Zoom: https://utrgv.zoom.us/j/83585846705

For further information or for special accommodations, please contact Dr. Alexey Glazyrin via email alexey.glazyrin@utrgv.edu.

More information about the seminar talks is available at the website https://www.utrgv.edu/math/news-events/seminars/brownsville/index.htm