

Super Irregularities

Jozsef Beck, Rutgers University

Superirregularity first appears naturally when we count the number of lattice points in tilted hyperbolic regions (finite segments) with quadratic irrational slopes. This is equivalent to counting the number of integer solutions of the classical Pell's equation/inequality and the inhomogeneous Pell inequality. The simplest "area principle" in lattice point counting says that the number of lattice points in a "reasonable" planar region should be close to the area of the region. Super irregularity, in a nutshell, means that the error term is comparable to the area. Finite hyperbola regions are certainly "reasonable"; nevertheless, there are many problems, far beyond lattice point counting, where hyperbolic regions exhibit "super irregularity", representing extra large discrepancy. We illustrate this with several results.