



Berlin  
Mathematical  
School

## BMS Friday Colloquium

Friday 31 October 2014 at 14:15

Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Martin Henk  
(TU Berlin)

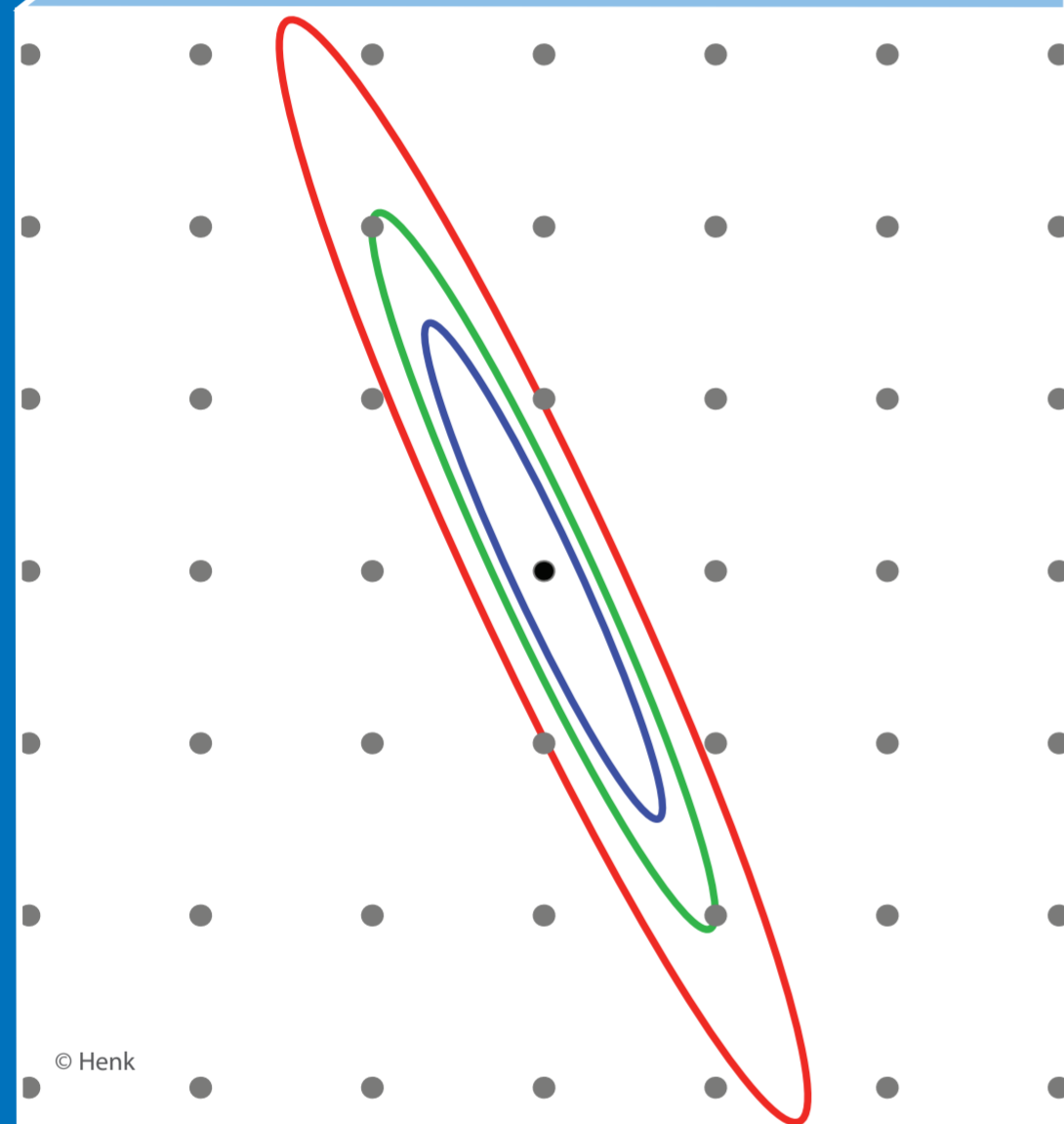
### Geometry of Numbers: Convex Bodies and Lattice Points

In 1850 Hermite showed that every positive quadratic form  $\mathbf{x}^T A \mathbf{x}$  in  $n$  variables has a non-trivial integral solution  $\mathbf{z}$  such that  $\mathbf{z}^T A \mathbf{z} \leq h_n (\det A)^{1/n}$ , where  $h_n$  depends only on  $n$ . For instance, for  $n = 2$  it is known that  $h_2 = 2/\sqrt{3}$  and hence there exists an integral solution of

$$193 x_1^2 + 217 x_1 x_2 + 61 x_2^2 = 1.$$

Forty years later, Minkowski gave a geometric proof of Hermite's classical result by interpreting the quadratic form as the distance function of an ellipsoid. He also noticed that his approach works for any convex body symmetric to the origin. This led him to a large body of important results to which he gave the name Geometry of Numbers. Today it is an independent, problem-oriented field which relates to various diverse areas of mathematics, and at its heart is the interplay of lattice (integral) points and convex bodies. In his talk, Henk will give an introduction to this fascinating interplay where he will emphasize its convex geometric aspects.

Martin Henk is a professor of mathematics at TU Berlin. His main research areas are convex and discrete geometry. Henk completed his doctorate and habilitation at U Siegen in 1991 and 1995, respectively. In 2002, Henk was awarded the Hlawka Prize by the Austrian Academy of Sciences. He was also honored with the Johann Joseph Ritter von Prechtel Medal by TU Wien in 2008. Before joining TU Berlin in October, Henk was a professor at the Institute for Algebra and Geometry at U Magdeburg from 2003 to 2014.



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