Institut für Geometrie

Vortrag

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Farey fraction spin chains and Gauss-Kuz'min statistics for quadratic irrationals

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Farey fraction spin chains were introduced by P. Kleban and A. E. Özlük in 1999. Let $A = \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$. Recently F. P. Boca proved the following asymptotic formula for the number of spin chains with bounded trace (energy)

$$\Psi(N) = |\{C = A^{a_1} B^{a_2} A^{a_3} \dots : \ 3 \leq \operatorname{Tr} C \leq N\}| = N^2(c_1 \log N + c_0) + O_\varepsilon(N^{7/4+\varepsilon}).$$

In the talk the sharper result

$$\Psi(N) = N^2(c_1 \log N + c_0) + O(N^{3/2+\varepsilon})$$

will be presented. This formula can be generalized for the case of Gauss-Kuz'min statistics and gives a result about quadratic irrationals. In particular it implies that continued fraction expansions of purely periodic quadratic irrationals have the same statistical properties as continued fraction expansions of almost all real numbers.

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