SYSTOLE OF CONGRUENCE COVERINGS OF HILBERT MODULAR VARIETIES

Plinio G. P. Murillo
Impa

Resumo/Abstract:

It is known that the systole of principal congruence coverings M_I of a compact arithmetic hyperbolic manifold M grows logarithmically with its volume, but only explicit value of the constant in the systole growth was known in dimension 2 and 3. Concretely

$$\mathrm{sys}\pi_1(\mathrm{M_I}) \geq \frac{4}{3}\log(\mathrm{vol}(\mathrm{M_I})) - \mathrm{c},$$

in the 2-dimensional case, and in dimension 3

$$\mathrm{sys}\pi_1(\mathrm{M_I}) \geq \frac{2}{3}\log(\mathrm{vol}(\mathrm{M_I})) - \mathrm{d},$$

where c and d are constants independent on M_I ([3],[1]).

In this talk I will prove that principal congruence coverings of Hilbert modular varieties, which are non-compact Riemannian arithmetic manifolds of dimension $2n$, satisfies

$$\mathrm{sys}\pi_1(\mathrm{M_I}) \geq \frac{4}{3\sqrt{\mathrm{n}}}\log(\mathrm{vol}(\mathrm{M_I})) - \mathrm{c},$$

where c is a constant independent of M_I [2].

References

[1] M. Katz, M. Schaps, and U. Vishne. Logarithmic growth of systole of arithmetic Riemann surfaces along congruence subgroups. *Journal of Differential Geometry*, 76(3):399–422, 2007.

[2] P. Murillo. On growth of systole along congruence coverings of Hilbert modular varieties. *arXiv:1605.05398*, 2016.

[3] P. Sarnak and P. Buser. On the period matrix of a Riemann surface of large genus (with an appendix by J. H. Conway and N. J. A. Sloane). *Inventiones Mathematicae*, 117:27–56, 1994.