Semana da Álgebra, 12 e 14 de fevereiro de 2020
Programa de Verão, Pós-Graduação em Matemática
Departamento de Matemática, IMECC, UNICAMP
SALA 321, IMECC

12 DE FEVEREIRO, QUARTA-FEIRA		
1300–1400	Severino Collier, UFRJ	*A new family of foliations with one singularity*
1400–1500	Amilcar Pacheco, UFRJ	*Torsion subgroup of abelian varieties over function fields*
14 DE FEVEREIRO, SEXTA-FEIRA		
1300–1400	Herivelto Borges, ICMC, USP	*The p-rank of a class of cyclic covers of* $\mathbb{P}^1$
1400–1500	Carolina Araújo, IMPA	*Geometria Algébrica: desenvolvimentos recentes e tendências futuras*

1. **S. C. Coutinho, IM, UFRJ**: *A new family of foliations with one singularity*

A number of results, in recent years, have been concerned with line fields (foliations) with one singularity on the complex projective plane. Thus, [1] presents a classification of line fields of degree 2 with one singularity, while [2, Theorem 1, p. 192] introduces a family of foliations with one singularity of algebraic multiplicity one. In this talk I will present a new family of line fields of degree $d \geq 4$ whose unique singularity has multiplicity $d-1$. The generic elements in this family have trivial isotropy groups and a unique invariant algebraic curve, thus giving rise to a new family of simple derivations of the affine plane. This is joint work with Filipe Ramos Ferreira (bolsista PIBIC-CNPq).

References

[1] Cerveau, D. and Déserti, J. and Garba Belko, D. and Meziani, *Géométrie classique de certains feuilletages de degré deux*, Bull. Braz. Math. Soc. (N.S.), **41**, (2010), 161–198.

[2] Alcántara, C. R., *Foliations on $\mathbb{CP}^2$ of degree d with a singular point with Milnor number d^2+d+1*, Rev. Mat. Complut., **31**, (2018), 187–199.

2. **Amilcar Pacheco, IM, UFRJ**: *Torsion subgroup of abelian varieties over function fields*

We shall discuss upper bounds for the torsion subgroup of the Mordell-Weil group of an abelian variety over a one variable function field over a finite field which will depend on the genus of the function field and the dimension of the abelian, but not only on these. It involves the differential height of the abelian variety. We also prove a lower bound for the canonical height of a point of infinite order in terms of the differential height. The two results together are an instance of a conjecture of Lang and Silverman, in the context of function fields. This is joint work with Sinnou David.

3. **Herivelto Borges, ICMC, USP**: *The p-rank of a class of cyclic covers of $\mathbb{P}^1$*

For any irreducible algebraic curve $\mathcal{X}$ defined over a field $\mathbb{K}$, its genus $g(\mathcal{X})$ is certainly the most famous birational invariant. If $\mathbb{K}$ has characteristic $p>0$, then the curve $\mathcal{X}$ has another important birational invariant, called Hasse-Witt invariant or the p-rank of $\mathcal{X}$, which is the integer $\gamma := \gamma(\mathcal{X}) \in \{0,1,\ldots,g(\mathcal{X})\}$ for which $Pic_0(\mathbb{K}(\mathcal{X}),p) \cong (\mathbb{Z}_p)^\gamma$.

It is well known that number $\gamma(\mathcal{X})$ is closely related to certain arithmetic and geometric properties of $\mathcal{X}$. For instance, $\mathbb{F}_{p^{2n}}$-maximal and $\mathbb{F}_{p^{2n}}$-minimal curves $\mathcal{X}$ have $\gamma(\mathcal{X})=0$, and curves with large p-rank have a somewhat small automorphism group. In this talk, we discuss recent results on the computation of the p-rank of the curves $\mathcal{F}_{m,n}\colon y^m+x^n+1=0$, and some of its consequences. In particular, via Deuring-Shafarevich formula, we will present the p-rank of other important classes of curves such as the Dickson-Guralnick-Zieve curves.

4. **Carolina Araújo, IMPA**: *Geometria Algébrica: desenvolvimentos recentes e tendências futuras*

A geometria algébrica é uma das áreas mais antigas e ativas da matemática, onde se estudam objetos geométricos definidos por equações polinomiais. Esses objetos aparecem naturalmente em diferentes campos da ciência, e o estudo de suas propriedades tem importantes aplicações dentro e fora da matemática.

Nesta palestra, farei uma breve introdução à geometria Algébrica, destacarei alguns dos mais importantes desenvolvimentos recentes na área e discutirei tendências futuras.