

Linear optimization on varieties and Chern-Mather classes

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The linear optimization degree gives an algebraic measure of complexity of optimizing a linear objective function over an algebraic model. Geometrically, it can be interpreted as the degree of a projection map on the affine conormal variety. Fixing an affine variety, the first result presented in this talk shows that the geometry of this conormal variety, expressed in terms of bidegrees, completely determines the Chern-Mather classes of the given variety. I will also explain how these bidegrees can be identified with the linear optimization degrees of generic affine sections. Time permitting, I will show an application to the calculation of the Euclidean distance degree, which measures the algebraic complexity of the nearest point problem. (Based on joint work with Jose Rodriguez, Botong Wang and Lei Wu.)

References

- [1] L. Maxim, J. Rodriguez, B. Wang, L. Wu, Linear optimization on varieties and Chern-Mather classes, *Advances in Mathematics* **437** (2024), Paper No. 109443.
- [2] L. Maxim, J. Rodriguez, B. Wang, Euclidean distance degree of the multiview variety, *SIAM Journal on Applied Algebra and Geometry* **4** (2020), no. 1, 28–48.