

Exposé court

66 Solving Fermat type equations over number fields via modular approach

Kara, Yasemin (Bogazici University)

The asymptotic Fermat conjecture (AFC) states that for a number field K not containing ζ_3 , there is a bound B_K depending only on the field K such that for all prime exponents $p > B_K$, the equation $x^p + y^p + z^p = 0$ has only trivial solutions. The strategy which is referred as the “modular method” to solve the Fermat equation, used by Wiles in his famous proof, can be adapted to attack AFC and its several different generalizations. Similar results are quite rare for other Fermat type equations such as $x^p + y^q = z^r$ although the solutions of this equation have been studied over rationals. In this talk, we will mention some recent asymptotic results for the classical Fermat equation as well as some other Fermat type equations over number fields by assuming some standard modularity conjecture. Moreover, we will explain how this bound can be made explicit for some specific number fields.

This talk is based on joint works with Erman Isik and Ekin Ozman.

Bibliography

- [1] E. Işık, Y. Kara, and E. Ozman. On ternary Diophantine equations of signature $(p, p, 3)$ over number fields. *Canad. J. Math.*, pages 1–21. doi:10.4153/S0008414X22000311. forthcoming.
- [2] E. Işık, Y. Kara, and E. Ozman. On ternary Diophantine equations of signature $(p, p, 2)$ over number fields. *Turkish J. Math.*, 44(4):1197–1211, 2020. doi:10.3906/mat-1911-88.
- [3] Y. Kara and E. Ozman. Asymptotic generalized Fermat’s last theorem over number fields. *Int. J. Number Theory*, 16(5):907–924, 2020. doi:10.1142/S1793042120500463.