

Motives meet SymPy: studying λ -ring expressions in Python

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Abstract-

We present a new Python package called "motives", a symbolic manipulation package based on SymPy capable of handling and simplifying motivic expressions in the Grothendieck ring of Chow motives and other types of λ -rings. The package is able to manipulate and compare arbitrary expressions in λ -rings and, in particular, it contains explicit tools for manipulating motives of several types of commonly used moduli schemes and moduli stacks of decorated bundles on curves. We have applied this new tool to advance in the verification of Mozgovoy's conjectural formula for the motive of the moduli space of twisted Higgs bundles, proving that it holds in rank 2 and 3 for any curve of genus up to 18 and any twisting bundle of small degree.

Index Terms- λ -rings, symbolic computations of motives, Chow motives, moduli spaces, Higgs bundles moduli space

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Citation:

Alfaya, D.; Pizarroso, J.; Sánchez Sánchez, D. "Motives meet SymPy: studying λ -ring expressions in Python", *Electronic Research Archive*, vol.33, no.4, pp.2118-2147, December, 2025.