

On the cohomology groups of the IA-automorphism groups of free groups of rank three

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In this talk we consider the low-dimensional rational cohomology groups of the IA-automorphism group of a free group in the case where the rank of the free group is three.

In particular, we detect non-trivial irreducible component in the second cohomology group, which does not contained in the image of the cup product map of the first cohomology groups. We also show that the image of the triple cup product map of the first cohomology groups in the third cohomology group is trivial.

As a corollary, we obtain that the fourth term of the lower central series of the IA-automorphism group has finite index in that of the Andreadakis-Johnson filtration.