

**Scientific report on the implementation of the project
in the period November 2013-December 2013**

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In the period November-December 2013, we started the implementation of the project dealing with the three planned research directions :

- (1) Arithmetic homogeneous spaces ;
- (2) R-equivalence on homogeneous spaces ;
- (3) Application of torsors to infinite dimensional Lie theory.

Documentation has been our main activity. In concrete terms, we started to study several recent papers which are directly related to the first topic. The two members of the project met twice a week as planned.

In the third research direction, we obtained results on the generation of certain groups which are important in the Kac-Moody theory. Those are related to Lie algebras over Laurent polynomials. Precisely this is the paper [1] written with V. Chernousov and A. Pianzola.

The methods are quite classical and based on a precise study of a group action over a suitable Bruhat-Tits building. This limits the investigations to the nullity one case but we have some hope for the general case which looks much more complicated.

[1] V. Chernousov, P. Gille and A. Pianzola, *Whitehead groups of loop group schemes of nullity one*, preprint (November 2013).

The web site of the project http://math.univ-lyon1.fr/homes-www/gille/idei_pg.html provides an abstract of activities, link to papers and details on all talks and conferences given.