

Bulletin

de la SOCIÉTÉ MATHÉMATIQUE DE FRANCE

**Tome 153
Fascicule 1**

2025

Geoffrey Powell & Christine Vespa — Higher Hochschild homology and exponential functors .	1-141
Thomas Dreyfus & Marina Poulet — On the computation of the difference Galois groups of order 3 equations	143-186
Yota Shamoto — Stokes structure of mild difference modules	187-212
Yongpan Zou — Nakano positivity of direct image sheaves of adjoint line bundles with mild singularities	213-235
Elena Dimitriadis Bermejo — A new model of dg-categories	237-293

SOCIÉTÉ MATHÉMATIQUE DE FRANCE

Pages 1-293

Sommaire

Geoffrey Powell & Christine Vespa — Homologie de Hochschild supérieure et foncteurs exponentiels	1-141
Thomas Dreyfus & Marina Poulet — Sur le calcul des groupes de Galois aux différences d'équations d'ordre trois	143-186
Yota Shamoto — Structure de Stokes des modules à différences modérées	187-212
Yongpan Zou — Positivité de Nakano des faisceaux images directes des fibrés en droites adjoints avec des singularités modérées	213-235
Elena Dimitriadis Bermejo — Un nouveau modèle des dg-catégories	237-293

Contents

Geoffrey Powell & Christine Vespa — Higher Hochschild homology and exponential functors	1-141
Thomas Dreyfus & Marina Poulet — On the computation of the difference Galois groups of order 3 equations	143-186
Yota Shamoto — Stokes structure of mild difference modules	187-212
Yongpan Zou — Nakano positivity of direct image sheaves of adjoint line bundles with mild singularities	213-235
Elena Dimitriadis Bermejo — A new model of dg-categories	237-293

HIGHER HOCHSCHILD HOMOLOGY AND EXPONENTIAL FUNCTORS

BY GEOFFREY POWELL & CHRISTINE VESPA

ABSTRACT. — We study higher Hochschild homology evaluated on wedges of circles, viewed as a functor on the category of free groups. The main results use coefficients arising from square-zero extensions; this is motivated by work of Turchin and Willwacher in relation to hairy graph cohomology.

The functorial point of view allows us to exploit tools such as the theory of polynomial functors and exponential functors. We also introduce and make essential use of the category of outer functors, the full subcategory of functors on free groups on which inner automorphisms act trivially.

We give a description of higher Hochschild homology in terms of intrinsically defined polynomial outer functors; we also obtain several explicit computations of these outer functors, working over a field of characteristic zero. In particular, higher Hochschild homology gives a natural source of non-trivial polynomial outer functors.

Texte reçu le 11 octobre 2019, modifié le 9 septembre 2024, accepté le 31 octobre 2024.

GEOFFREY POWELL, Univ Angers, CNRS, LAREMA, SFR MATHSTIC, F-49000 Angers, France • *E-mail* : Geoffrey.Powell@math.cnrs.fr • *Url* : <https://math.univ-angers.fr/~powell/>

CHRISTINE VESPA, Aix-Marseille Université/Centrale Marseille, Institut de Mathématiques de Marseille, Marseille, France. • *E-mail* : christine.vespa@univ-amu.fr • *Url* : <https://www.i2m.univ-amu.fr/perso/christine.vespa/>

Mathematical subject classification (2010). — 55N99, 18A25, 13D03, 20J05.

Key words and phrases. — Functors, outer functors, exponential functors, higher Hochschild homology, free groups, outer automorphisms, Schur functor.

This work was partially supported by the ANR Project *ChroK*, ANR-16-CE40-0003. The first author was also supported by the project *Nouvelle Équipe*, convention 2013-10203/10204 between the Région des Pays de la Loire and the Université d'Angers. The second author was also supported by the ANR projects *AlMaRe* ANR-19-CE40-0001-01, *HighAGT* ANR-20-CE40-0016, and *SHoCoS* ANR-22-CE40-0008.