DOCTORAL PROGRAMME IN MATHEMATICAL SCIENCES

Per il Dottorato in Scienze Matematiche dell'Università degli Studi di Milano

il Prof. **Marino Gran**
dell'Université catholique de Louvain - Belgique

terrà un corso di dottorato su

Semi-abelian categories, semi-localizations and factorization systems

Abstract

Semi-abelian categories [6] provide a suitable context to study the (co)homology of non-abelian algebraic structures (such as groups, Lie algebras, crossed modules and compact groups), torsion theories, and commutators. In this mini-course a brief introduction to some basic properties of these categories will be given, such as the validity of the classical homological lemmas and the isomorphism theorems from group theory [1]. In the last part we shall focus on more advanced aspects of the theory.

These latter aspects will concern the relationship between torsion theories in semi-abelian categories and semi-left-exact reflections in the sense of [4], and the correspondence with radicals, closure operators and factorizations systems [2, 3]. An abstract characterization of semi-localizations [7] of semi-abelian categories will be considered [5].

Concerning the preliminaries needed to follow these lectures, some knowledge of the basic properties of regular categories will be helpful. These preliminaries will be briefly recalled at the beginning of the course, and some notes will be available.

References

[1] F. Borceux and D. Bourn, Mal'cev, Protomodular, Homological and Semi-Abelian Categories, Math. and its Appl. Vol. 566 (2004).

[2] D. Bourn and M. Gran, *Torsion theories in homological categories*, Journal of Algebra 305 (2006) 1–10.

[3] A. Carboni, G. Janelidze, G.M. Kelly, and R. Paré, *On localization and stabilization of factorization systems*, Appl. Categ. Structures 5 (1997) 1–58.

[4] C. Cassidy, M. Hébert, and G.M. Kelly, *Reflective subcategories, localizations and factorizations systems*, Journal Australian Math. Society 38 (1985) 287–329.

[5] M. Gran and S. Lack, *Semi-localizations of semi-abelian categories*, Journal of Algebra 454 (2016) 206–232.

[6] G. Janelidze, L. Márki and W. Tholen, *Semi-abelian categories*, Journal of Pure and Applied Algebra, 168 (2002) 367–386.

[7] S. Mantovani, *Semilocalizations of exact and lextensive categories,* Cahiers Topolo gie Géom. Différentielle Catégoriques 39 (1998) 27-44.

Calendario

Il corso si svolgerà nei seguenti giorni:

- **8, 9, 10 gennaio 2018** dalle ore **16.00** alle ore **18.00**
- **11 gennaio 2018** dalle ore **10.30** alle ore **12.30**
- **12 gennaio 2018** dalle ore **9.30** alle ore **11.30**

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