

CATEGORY THEORY RESEARCH SEMINAR:

What we know and what we do not know about noetherian forms

Prof Zurab Janelidze (Stellenbosch University)

DATE: Tuesday, 7 May 2024 | 12h00 – 13h00 SAST

VENUES:

- Room 1006, Mathematics and Industrial Psychology Building, Stellenbosch University
- Online

ABSTRACT

The aim of this talk is to highlight major results obtained thus far in the study of noetherian forms, as well as to discuss some open questions and possible future research directions. A noetherian form is a large-scale mathematical structure, defined by simple self-dual axioms. It is a large-scale structure in the same sense as, e.g., categories are: its examples are formed by smaller, set-based mathematical structures of a given type. The purpose of this structure is to provide an axiomatic framework that allows one to establish all the standard homomorphism theorems (e.g., isomorphism theorems and diagram lemmas of homological algebra), that are valid for various algebraic, especially group-like structures. Noetherian forms can be viewed as categories equipped with a data of “subobjects”. Such data can often be extracted from the category itself (instead of imposing an external structure). According to a recent result by Francois van Niekerk, all algebraic categories have noetherian forms. This does not necessarily mean that, e.g., we can do meaningful homological algebra in every algebraic category as oftentimes homological algebra produced by such noetherian form is trivial (due to the absence of non-trivial exact sequences). Nevertheless, it is interesting that what originally was thought of as a feature of specifically group-like structures is so widely present in other categories.

BIOGRAPHY

Zurab Janelidze is a Professor of Mathematics in the Department of Mathematical Sciences at Stellenbosch University. He is a Principal Investigator in the Mathematical Structures and Modelling research programme at NITheCS. He serves on the editorial boards of two international journals in his field of expertise, category theory, as well as *Afrika Matematika* (the journal of the African Mathematical Union), and currently serves as the president of the South African Mathematical Society.

WHO SHOULD ATTEND?

All are welcome. It will be assumed that the audience is familiar with basic concepts of category theory.



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