Bruno Costa Coscarelli, ***Model Theory in a Paraconsistent Environment***, University of Campinas, Brazil, 2020. Supervised by Marcelo Esteban Coniglio. MSC: 03B53, 03C99, 03B70. Keywords: paraconsistent logics, Logics of Formal Inconsistency, Model Theory, first-order logics, Paraconsistent Logic Programming.

Abstract

The purpose of this thesis is to develop a paraconsistent Model Theory. The basis for such a theory was launched by Walter Carnielli, Marcelo Esteban Coniglio, Rodrigo Podiack, and Tarcísio Rodrigues in the article 'On the Way to a Wider Model Theory: Completeness Theorems for First-Order Logics of Formal Inconsistency' [***The Review of Symbolic Logic***, vol. 7 (2014)].

Naturally, a complete theory cannot be fully developed in a single work. Indeed, the goal of this work is to show that a paraconsistent Model Theory is a sound and worthy possibility. The pursuit of this goal is divided in three tasks: The first one is to give the theory a philosophical meaning. The second one is to transpose as many results from the classical theory to the new one as possible. The third one is to show an application of the theory to practical science.

The response to the first task is a Paraconsistent Reasoning System. The start point is that paraconsistency is an epistemological concept. The pursuit of a deeper understanding of the phenomenon of paraconsistency from this point of view leads to a reasoning system based on the Logics of Formal Inconsistency. Models are regarded as states of knowledge and the concept of isomorphism is reformulated so as to give raise to a new concept that preserves a portion of the whole knowledge of each state. Based on this, a notion of refinement is created which may occur from inside or from outside the state.

In order to respond to the second task, two important classical results, namely the Omitting Types Theorem and Craig's Interpolation Theorem are shown to hold in the new system and it is also shown that, if classical results in general are to hold in a paraconsistent system, then such a system should be in essence how it was developed here.

Finally, the response to the third task is a proposal of what a Paraconsistent Logic Programming may be. For that, the basis for a paraconsistent PROLOG is settled in the light of the ideas developed so far.

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Christian d'Elbée. ***Expansions and Neostability in Model Theory***, Institut Camille Jordan, Université de Lyon, Lyon, France, 2019. Supervised by Thomas Blossier and Zoé Chatzidakis. MSC: 03C10, 03C45, 03C64, 03C50, 03C60. Keywords: generic expansions, fields with generic subgroups, NSOP_1 theories, forking, Kim-forking, p-adic valuations on integers, finite dp-rank.

Abstract

This thesis is concerned with the expansions of algebraic structures and their fit in Shelah's classification landscape.

The first part deals with the expansion of a theory by a random predicate for a substructure model of a reduct of the theory. Let T be a theory in a language $\mathcal{L}$. Let T_0 be a reduct of T. Let $\mathcal{L}_S = \mathcal{L} \cup \{S\}$, for S a new unary predicate symbol, and T_S be the $\mathcal{L}_S$-theory that axiomatises the following structures: $(\mathcal{M}, \mathcal{M}_0)$ consist of a model $\mathcal{M}$ of T and S is a predicate for a model $\mathcal{M}_0$ of T_0 which is a substructure of $\mathcal{M}$. We present a setting for the existence of a model-companion TS of T_S. As a consequence, we obtain the existence of the model-companion of the following theories, for $p > 0$ a prime number:

- ACF_p, $\mathrm{SCF}_{e,p}$, Psf_p, ACFA_p, $\mathrm{ACVF}_{p,p}$ in appropriate languages expanded by arbitrarily many predicates for additive subgroups;