► BAHAREH AFSHARI, *An infinitary treatment of fixed point modal logic.*
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Fixed point modal logic deals with the concepts of induction and recursion in a most fundamental way. The term refers to any logic built on the foundation of modal logic that features inductively and/or co-inductively defined operators. Examples range from simple temporal logics (e.g. tense logic and linear time logic) to the highly expressive modal μ-calculus and its extensions.

We explore the proof theory of fixed point modal logic with converse modalities, commonly known as 'full μ-calculus'. Building on nested sequent calculi for tense logics [2] and infinitary proof theory of fixed point logics [1], a cut-free sound and complete proof system for full μ-calculus is proposed. As a result of the framework, we obtain a direct proof of the regular model property for the logic (originally proved in [4]): every satisfiable formula has a tree model with finitely many distinct subtrees (up to isomorphism). Many of the results appeal to the basic theory of well-quasi-orders in the spirit of Kozen's proof of the finite model property for μ-calculus [3].

This talk is based on joint work with Gerhard Jäger (University of Bern) and Graham E. Leigh (University of Gothenburg).

[1] Gerhard Jäger, Mathias Kretz and Thomas Studer, *Canonical completeness of infinitary mu*, ***J. Log. Algebr. Program***, vol. 76.2 (2008), pp. 270–292.

[2] Ryo Kashima, *Cut-free sequent calculi for some tense logics*, ***Studia Logica***, vol. 53.1 (1994), pp. 119–135.

[3] Dexter Kozen, *Cut-free sequent calculi for some tense logics*, ***Theor. Comput. Sci***, vol. 27 (1983), pp. 333–354.

[4] Moshe Vardi, *Reasoning about the past with two-way automata*, ***Automata, Languages and Programming*** (Warsaw, Poland), (K.G. Larsen, S. Skyum and G. Winskel, editors), Springer Berlin Heidelberg, 1998, pp. 628–641.