

Bezhanishvili, Nick; Gabelaia, David; Ghilardi, Silvio; Jibladze, Mamuka

Admissible bases via stable canonical rules. (English) [Zbl 1397.03016](#)

Stud. Log. 104, No. 2, 317-341 (2016).

The dichotomy property means that a canonical multi-conclusion rule is either admissible or equivalent to an assumption-free rule. The authors establish the same property for stable multi-conclusion canonical rules for the intuitionistic propositional calculus (IPC), and the modal systems K4 and S4 (see [V. V. Rybakov, Admissibility of logical inference rules. Amsterdam: Elsevier (1997; [Zbl 0872.03002](#))]). An immediate consequence of the main result is decidability of the admissibility problem for IPC, K4 and S4, while the admissibility for the basic modal logic K remains a long standing open problem.

Reviewer: [Branislav Boričić](#) (Beograd)

MSC:

[03B20](#) Subsystems of classical logic (including intuitionistic logic)

[03B25](#) Decidability of theories and sets of sentences

[03B45](#) Modal logic (including the logic of norms)

Cited in 1 Document

Keywords:

[admissible rules](#); [admissible bases](#); [modal logic](#); [intuitionistic logic](#); [modal algebras](#); [Heyting algebras](#); [canonical rules](#); [decidability](#).

Full Text: [DOI](#)

References:

- [1] Bezhanishvili, G., N. Bezhanishvili, and R. Iemhoff, Stable canonical rules, *Journal of Symbolic Logic*, to appear. Available as the ILLC Prepublication Series Report PP-2014-08. · [Zbl 1345.03034](#)
- [2] Bezhanishvili, G., Y. Bezhanishvili, and J. Ilin, Cofinal stable logics. Submitted. Available as the ILLC Prepublication Series Report PP-2015-08, 2015. · [Zbl 0318.02002](#)
- [3] Bezhanishvili, G.; Mines, R.; Morandi, P. J., Topo-canonical completions of closure algebras and Heyting algebras, *Algebra Universalis*, 58, 1-34, (2008) · [Zbl 1135.06009](#) · [doi:10.1007/s00012-007-2032-2](#)
- [4] Bezhanishvili, N., and S. Ghilardi, Multiple-conclusion rules, hypersequents syntax and step frames, in R. Gore, B. Kooi, and A. Kurucz, (eds.), *Advances in Modal Logic (AiML 2014)*, An extended version available as ILLC Prepublication Series Report PP-2014-05, College Publications, 2014, pp. 54-61. · [Zbl 1385.03016](#)
- [5] Blackburn P., de Rijke M., Venema Y.: *Modal Logic*. Cambridge University Press, Cambridge (2001) · [Zbl 0988.03006](#) · [doi:10.1017/CBO9781107050884](#)
- [6] Chagrov A., Zakharyashev M.: *Modal Logic*. The Clarendon Press, Oxford (1997)
- [7] Cintula, P.; Metcalfe, G., Admissible rules in the implication-negation fragment of intuitionistic logic, *Annals of Pure and Applied Logic*, 162, 162-171, (2010) · [Zbl 1225.03011](#) · [doi:10.1016/j.apal.2010.09.001](#)
- [8] Davey B. A., Priestley H. A.: *Introduction to Lattices and Order*, 2nd edn., Cambridge University Press, New York (2002) · [Zbl 1002.06001](#) · [doi:10.1017/CBO9780511809088](#)
- [9] Esakia, L., Topological Kripke models, *Soviet Mathematics Doklady*, 15, 147-151, (1974) · [Zbl 0296.02030](#)
- [10] Friedman, H., One hundred and two problems in mathematical logic, *Journal of Symbolic Logic*, 40, 113-129, (1975) · [Zbl 0318.02002](#) · [doi:10.2307/2271891](#)
- [11] Ghilardi, S., Unification in intuitionistic logic, *Journal of Symbolic Logic*, 64, 859-880, (1999) · [Zbl 0930.03009](#) · [doi:10.2307/2586506](#)
- [12] Ghilardi, S., Best solving modal equations, *Annals of Pure and Applied Logic*, 102, 183-198, (2000) · [Zbl 0949.03010](#) · [doi:10.1016/S0168-0072\(99\)00032-9](#)
- [13] Ghilardi, S., Continuity, freeness, and filtrations, *Journal of Applied Non-classical Logics*, 20, 193-217, (2010) · [Zbl 1242.03049](#) · [doi:10.3166/jancl.20.193-217](#)
- [14] Goudsmit, J., Intuitionistic rules, admissible rules of intermediate logics. PhD thesis, University of Utrecht, 2015. · [Zbl 0992.03027](#)
- [15] Iemhoff, R., On the admissible rules of intuitionistic propositional logic, *Journal of Symbolic Logic*, 66, 281-294, (2001) · [Zbl 0986.03013](#) · [doi:10.2307/2694922](#)
- [16] Iemhoff, R., Consequence relations and admissible rules, *Journal of Philosophical Logic* 2015. [doi:10.1007/s10992-015-9380-8](#). · [Zbl 1392.03021](#)

- [17] Jeřábek, E., Independent bases of admissible rules, *Logic Journal of IGPL*, 16, 249-267, (2008) · [Zbl 1146.03008](#) · [doi:10.1093/jigpal/jzn004](#)
- [18] Jeřábek, E., Canonical rules, *Journal of Symbolic Logic*, 74, 1171-1205, (2009) · [Zbl 1186.03045](#) · [doi:10.2178/jsl/1254748686](#)
- [19] Kracht, M., *\textit{Tools and Techniques in Modal Logic}*, *Studies in Logic and the Foundations of Mathematics*, vol. 142, North-Holland Publishing Co., Amsterdam, 1999. · [Zbl 0927.03002](#)
- [20] Odintsov, S.; Rybakov, V., Unification and admissible rules for paraconsistent minimal johanssons' logic J and positive intuitionistic logic IPC^+ , *Annals of Pure and Applied Logic*, 164, 771-784, (2013) · [Zbl 1323.03029](#) · [doi:10.1016/j.apal.2013.01.001](#)
- [21] Rasiowa, H., and R. Sikorski, *\textit{The Mathematics of Metamathematics}*. Monografie Matematyczne Tom 41. Państwowe Wydawnictwo Naukowe, Warsaw, 1963. · [Zbl 0122.24311](#)
- [22] Rozière, P., *Regles admissibles en calcul propositionnel intuitionniste*. PhD thesis, Université Paris VII, 1992. · [Zbl 1146.03008](#)
- [23] Rybakov, V. V., Bases of admissible rules of the logics S_4 and Int , *\textit{Algebra i Logika}* 24(1):87-107, 123, 1985. · [Zbl 0598.03014](#)
- [24] Rybakov, V. V., *\textit{Admissibility of Logical Inference Rules}*, *Studies in Logic and the Foundations of Mathematics*, vol. 136, North-Holland Publishing Co., Amsterdam, 1997. · [Zbl 0872.03002](#)
- [25] Rybakov, V. V., Construction of an explicit basis for rules admissible in modal system S_4 , *Mathematical Logic Quarterly*, 47, 441-446, (2001) · [Zbl 0992.03027](#) · [doi:10.1002/1521-3870\(200111\)47:4<441::AID-MALQ441>3.0.CO;2-J](#)
- [26] Rybakov, V. V., Problems of substitution and admissibility in the modal system grz and in intuitionistic propositional calculus, *Annals of Pure and Applied Logic*, 50, 71-106, (1990) · [Zbl 0709.03009](#) · [doi:10.1016/0168-0072\(90\)90055-7](#)
- [27] Rybakov, V. V., Rules of inference with parameters for intuitionistic logic, *Journal of Symbolic Logic*, 57, 33-52, (1992) · [Zbl 0788.03007](#) · [doi:10.2307/2275439](#)
- [28] Venema, Y., Algebras and coalgebras. In Blackburn, P., J. van Benthem, and F. Wolter, editors, *\textit{Handbook of Modal Logic}*, *Studies in Logic and Practical Reasoning*, vol. 3. Elsevier, New York, 2007, pp. 331-426. · [Zbl 0774.03005](#)
- [29] Zakharyashev, M., Canonical formulas for K_4 I. basic results, *Journal of Symbolic Logic*, 57, 1377-1402, (1992) · [Zbl 0774.03005](#) · [doi:10.2307/2275372](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.