▸ KATSUHIKO SANO, *Goldblatt-Thomason theorems for non-classical logics.*
Department of Philosophy and Ethics, School of Humanities and Human Sciences, Hokkaido University, Nishi 7 Chome, Kita 10 Jo, Kita-ku, Sapporo, Hokkaido, 060-0810, JAPAN.
E-mail: v-sano@let.hokudai.ac.jp.

Many non-classical logics have Kripke semantics based on the notion of a graph or a Kripke frame (W, R) where W is a non-empty set and R is a binary relation on W. It is well-known that each of R's reflexivity, transitivity, symmetry and seriality is definable by a modal formula, while there is an undefinable property of R (e.g., irreflexivity) in terms of sets of modal formulas. Given a first-order property of Kripke frames, when is such a property definable by a set of modal formulas? The Goldblatt-Thomason theorem [3] for modal logic answers this question as follows: given a first-order definable class $\mathbb{F}$ of frames, the class $\mathbb{F}$ is definable by a set of modal formulas, if and only if, $\mathbb{F}$ is closed under taking generated subframes, disjoint unions and bounded morphic images and the complement of the class $\mathbb{F}$ is closed under taking ultrafilter extensions. That is, the modal definability of a first-order definable property of Kripke frames is characterized in terms of "nice" frame constructions. This talk overviews Goldblatt-Thomason-style characterizations for non-classical logics beyond modal logic, some of which are the author's own contributions [6, 7] with collaborators. Such examples of non-classical logics may include: graded modal logic [2], modal logic with the universal modality [4], modal dependence logic [8], intuitionistic logic [5], and intuitionistic inquisitive logic [1].

[1] Ivano Ciardelli, Rosalie Iemhoff, and Fan Yang, *Questions and dependency in intuitionistic logic*, ***Notre Dame Journal of Formal Logic***, in press, 2019.

[2] Kit Fine, *In so many possible worlds*, ***Notre Dame Journal of Formal Logic***, Vol. 13 (1972), No. 4, pp.516–520.

[3] Robert I. Goldblatt and Steve K. Thomason, *Axiomatic Classes in Propositional Modal Logic*, ***Algebra and Logic***, Springer-Verlag, (J. N. Crossley editor), pp.163–73, 1975.

[4] Valentin Goranko and Solomon Passy, *Using the universal modality: gains and questions*, ***Journal of Logic and Computation***, Vol. 2 (1992), No. 1, pp.5–30.

[5] Pieter Hendrik Rodenburg, ***Intuitionistic Correspondence Theory***, Universiteit van Amsterdam, 1986.

[6] Katsuhiko Sano and Minghui Ma, *Goldblatt-Thomason-style theorems for graded modal language*, ***Advances in Modal Logic***, (Lev Beklemishev and Valentin Goranko and Valentin Shehtman editors), College Publications, Vol. 8 (2010), No. 1, pp.330–349.

[7] Katsuhiko Sano and Jonni Virtema, *Characterising modal definability of team-based logics via the universal modality*, ***Annals of Pure and Applied Logic***, Available online 11 April 2019.

[8] Jouko Väänänen, *Modal dependence logic*, ***New Perspectives on Games and Interaction, Texts in Logic and Games***, (Krzysztof R. Apt, Robert van Rooij editors), Vol. 4 (2008), pp.237–254.