▶ ANNIKA KANCKOS, *On first-order variants of the ontological argument.*

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Gödel's ontological proof of the necessary existence of a godlike object, formally $\Box\exists x.G(x)$, usually requires a system for second-order modal logic in which the possible existence of a godlike object, $\Diamond\exists x.G(x)$, follows through an indirect and therefore classical proof. The implication $\Diamond\exists x.G(x) \to \Box\exists x.G(x)$ is then intuitionistically provable from the axioms and modal principles. However, by turning the ontological axioms and definitions into rules of proof extending the logical calculus, the system can be restricted to a first-order modal logic, thereby making second-order quantification superfluous in multiple standard variants of the argument.

Moreover, the proof of compatibility of positive properties requires classical reasoning, while it is provably impossible to derive it in an intuitionistic system. This can be directly shown by considering an arbitrary intuitionistic derivation of $\exists x.G(x)$ and showing that this entails a proof of $\bot$ in propositional modal logic. Thus, if the logical system is consistent, then $\exists x.G(x)$ is not intuitionistically derivable. The former consistency claim is assumed as trivial, but an easy soundness proof could demonstrate it, with respect to a standard Kripke semantics.

By considering Anderson's emendation [1], a variant by Hájek [3], Scott's variant [4], as well as a minimal axiomatization by Benzmüller [2], we can conclude that the underivability result holds for at least the former two, and the restriction to first-order logic generally holds for variants of the ontological argument.

[1] ANDERSON, C. A. & GETTINGS, M. , *Gödel's ontological proof revisited*, In: **Gödel '96, edited by Hájek P.**, Springer, 1996.

[2] BENZMÜLLER, C. *A Simplified Variant of Gödel's Ontological Argument*. To appear in **Sophia**, (2022).

[3] HÁJEK, P. *A new small emendation of Gödel's ontological proof*, **Studia Logica**, vol. 71 (2002), no. 2, pp. 149–164.

[4] SCOTT, D., *Appendix B. Notes in Dana Scotts hand.*, In: **Logic and Theism: Arguments for and against Beliefs in God** (J. H. Sobel, editor), Cambridge University Press, 2004, p. 145.