Supervisor's review of the bachelor thesis
Kamila Houšková:
The Interplay of Triangular Norms and Their Generators

Kamila Houšková prepared her thesis with much effort and very carefully. The topic was difficult mainly because its background is not taught in standard courses, but in a course Fuzzy Logic, originally intended for postgraduate students. There she learned the necessary theory only in autumn 2022. Nevertheless, she made a fast progress. She was an exception among our students—she took initiative and pushed me, the supervisor, to proceed faster.

Starting from somewhat routine observations on the effect of local changes of generators to the corresponding t-norms, she proceeded to more advanced topics. One of them was the use of higher derivatives in determination of generators, inspired by a preceding successful theorem using first derivatives. This appeared to be a dead branch of research, the extension was found impossible. Not discouraged by this, Kamila Houšková continued the study of generators.

One crucial problem is that—unlike Taylor series—the "global shape" of a generator brings very little information; the same t-norm has generators of quite different shapes. Thus the proper meaning of "shape" is a difficult problem. A progress was achieved by introducing a new notion of *balanced generator*. It is unique for a strict t-norm. Some strict t-norms do not admit a balanced generator. The thesis contains many examples of both cases of strict t-norms. Also the influence of local properties (derivatives) of generators on the shape of t-norms is documented in detail.

Before the defense, Kamila Houšková will present some results of her thesis at the international conference *Linz Seminar 2023*,[1] where our joint paper was accepted. She proved her professional skills at a very high level. Her

[1] `https://www.flll.jku.at/linz2023/`

thesis is a significant theoretical contribution with applicable consequences. I evaluate the thesis by the grade

A (excellent).

I think it is a good **candidate for the dean's award**.

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