Proof is number - proposals for a research program

Peteris Daugulis

Daugavpils university

Daugavpils, Latvia

The aim of this talk is to point out in a programmatic style the need to interpret and encode logical implications (inferences, consequences) and proofs as mathematical objects focusing on their mathematical properties and paying less attention to semantic specifics and syntactic issues. This means finding simple mathematical structures faithfully representing mathematical proofs and theories. Examples of mathematical considerations are given for such a theory, see also [2],[3],[1]. It must have important applications in research guidance and evaluation of mathematical results, these applications seem to be important in their own right. There are no theorems in this talk, most issues are discussed with a certain vagueness. The closest known problem is the 24th Hilbert's problem [4].

AMS subject classification:
00A30 - General, philosophy of mathematics
03B35 - General logic, mechanization of proofs and logical operations

References

[1] J.M. Font; R. Jansana, A general algebraic semantics for sentential logics, 1996, Springer-Verlag.

[2] D. Hughes, Proofs without syntax, *Annals of Mathematics* 2006, 164(3):1065-1076.

[3] M. Quispe-Cruz; E.H. Haeusler; L. Gordeev, Proof-graphs for minimal implicational logic, *M. Ayala-Rincon E. Bonelli and I. Mackie (Eds): Developments in Computational Models (DCM 2013) EPTCS*, 2014, 144:16-29.

[4] R. Thiele, Hilbert's twenty-fourth problem, *American Mathematical Monthly*, January 2003, 1-24.