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Surjections of Grothendieck toposes

Inclusions into Grothendieck toposes are well understood: it is known that there are equivalences between cartesian reflectors, Grothendieck topologies and local operators. Furthermore, subtoposes correspond to quotients of the theory that a Grothendieck topos classifies. However, turning to the "opposite" problem, we find that surjections out of a Grothendieck topos are not well understood in such terms. What is known is that they are equivalent to the category of coalgebras for the comonad induced by the surjection; yet when these form a Grothendieck topos, a characterization in terms of sites remains unknown.

The current work that is being done in order to find such a characterization for the localic case shall be presented, and we shall also explain why this is a stepping stone in the central issue of the speaker's in progress Ph. D. thesis: that of understanding exponentiability of toposes in terms of sites, which will shed light upon the open problem of knowing which theories exponentiable toposes classify.

References

[1] P. T. Johnstone, Sketches of an Elephant: a topos theory compendium, vols. 43–44 of Oxford Logic Guides, Oxford University Press, 2002.

[2] P.T. Johnstone and A. Joyal, Continuous Categories and Exponentiable Toposes, Journal of Pure and Applied Algebra 25 (1982) 255-296, North-Holland Publishing Company.