

The formal ball model for \mathcal{Q} -categories

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We generalize the construction of the formal ball model for metric spaces due to A. Edalat and R. Heckmann [1] to obtain computational models for separated \mathcal{Q} -categories. We fully describe

- (a) Yoneda complete and
- (b) continuous Yoneda complete \mathcal{Q} -categories via their formal ball models.

Our results yield solutions to two open problems in the theory of quasi-metric spaces: we show that

- (a) a quasi-metric space X is Yoneda complete iff its formal ball model is a dcpo, and
- (b) a quasi-metric space X is continuous and Yoneda complete iff its formal ball model $\mathbf{B}X$ is a domain that admits a simple characterisation of approximation.

REFERENCES

- [1] A. Edalat and R. Heckmann, *A computational model for metric spaces*, Theoretical Computer Science 193 (1998) 53–73.

*Joint work with Mateusz Kostanek.