2-bicategories of polynomials

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Abstract. The theory developed in [1], of polynomials over a locally cartesian closed category $\mathcal{E}$, is generalised for $\mathcal{E}$ just having pullbacks. The 2-categorical analogue of the theory of polynomials and polynomial functors is given, so that polynomials in a 2-category with pullbacks form a structure that I'll call a "2-bicategory", which is defined in the same way as one defines bicategories except that the homs are themselves 2-categories instead of mere categories. Moreover the process of forming associated polynomial 2-functors is a homomorphism of 2-bicategories. Canonical examples are presented which illustrate the ubiquity of polynomials within 2-categories, and their relevance for the study of internal fibrations, 2-toposes and higher operads.

References

[1] N. Gambino and J. Kock – *Polynomial functors and polynomial monads*, arXiv:0906.4931.