

We will continue online on Thursday, **February 18th, at 1pm on [ZOOM](#) platform** (for information how to access seminar and next programme visit

[this page](#)

) by the talk:

**Charles Walker**

## **Distributive laws, pseudodistributive laws and decagons**

Abstract:

The notion of a distributive law of monads was introduced by Beck [1], and gives a concise description of the data required to compose monads. In the two dimensional case, Marmolejo [4] defined pseudodistributive laws of pseudomonads (where the required diagrams only commute up to an invertible modification). However, this description requires a number of coherence conditions due to the extra data involved.

In this talk we give alternative definitions of distributive laws and pseudodistributive laws involving the decagonal coherence conditions which naturally arise when the involved monads and pseudomonads are presented in their extensive form [7, 3, 2, 6]. As an application, we show that of Marmolejo and Wood's eight coherence axioms for pseudodistributive laws [5], three are redundant. We will then go on to give (likely) minimal definitions of distributive laws and pseudodistributive laws, which further simplify the coherence conditions involved in this extensive viewpoint.

### References

[1] Jon Beck. Distributive laws. In Sem. on Triples and Categorical Homology Theory (ETH, Zürich, 1966/67), pages 119–140. Springer, Berlin, 1969.

[2] M. Fiore, N. Gambino, M. Hyland, and G. Winkler. Relative pseudomonads, Kleisli bicategories, and substitution monoidal structures. *Selecta Math. (N.S.)*, 24(3):2791–2830, 2018.

[3] Ernest G. Manes. *Algebraic theories*. Springer-Verlag, New York-Heidelberg, 1976.

Graduate

Texts in Mathematics, No. 26.

[4] F. Marmolejo. Distributive laws for pseudomonads. *Theory Appl. Categ.*, 5:No. 5, 91–147, 1999.

[5] F. Marmolejo and R. J. Wood. Coherence for pseudodistributive laws revisited. *Theory Appl. Categ.*, 20:No. 5, 74–84, 2008.

[6] F. Marmolejo and R. J. Wood. No-iteration pseudomonads. *Theory Appl. Categ.*, 28:No. 14, 371–402, 2013.

[7] Robert Frank Carlsaw Walters. A categorical approach to universal algebra. PhD thesis, Australian National University, 1970.