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Adjoining Adjoints to a Free Category on a Graph

The Π_2 -construction, introduced in [1], freely adds right adjoints to the arrows of a category. When this construction is applied to a category that is freely generated on a graph it produces a 2-category where the arrows are paths of forward and backward arrows in the graph, and the 2-cells are Kauffman diagrams, where the strings are directed and labeled by the arrows of the graph.

This construction can be extended to 2-graphs and one may also include further layers of adjoints. When the underlying graph or 2-graph has only one object, the resulting categories can be viewed as monoidal categories with a partial trace. In this talk I will discuss various aspects of the structure of these categories.

This is joint work with Robert Dawson (Saint Mary's University) and Robert Paré (Dalhousie University).

References

- [1] Robert Dawson, Robert Paré and Dorette Pronk, *Adjoining adjoints*. Adv. Math. **178**(2003), 99–140.