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Adjoining Cycles of Adjoint Arrows

The Π_2 construction [2] freely adds right adjoints to all arrows (or a suitably chosen subset of the arrows) of a category. When one considers this construction, one may wonder what one needs to do in order to obtain a 2-category in which every arrow has both a left and a right adjoint. As was shown in [1], such arrows come in cycles, either an infinite cycle or a finite cycle. In this talk we will present a construction which freely adds specified cycles of adjoints to classes of arrows in a category that is freely generated on a graph. (This is our first step toward such a construction for arbitrary categories and 2-categories.) As a result we obtain families of non-trivial examples of categories containing cycles of arrows which are both left and right adjoints.

This is joint work with Robert Dawson and Robert Paré.

References

[1] P. I. Booth, *Sequences of adjoint functors*. Arch. Math. **23**(1972), 489–493.

[2] R. J. M. Dawson, R. Paré and D. A. Pronk, *Adjoining adjoints*. Adv. in Math. **178**(2003), 99–140.