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Commutativity and tensor products of theories, monads and operads

We present a unified approach to the notion of commutativity for theories, monads and (symmetric) operads. This approach consists of considering monads, and commutativity thereof, in an appropriate bicategory equipped with a suitably lax monoidal structure. We define a tensor product of a pair of such monads as the universal one in which they commute, generalising the usual tensor product of monads, theories and symmetric operads. Structures of recent relevance, such as categories with two compatible monoidal structures (known as *duoidal* or *2-monoidal categories*), occur naturally in our constructions.

This is joint work with Richard Garner.