

# (Op)lax natural transformations for higher categories, relative quantum field theories, and the "even higher" Morita category

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A relative (also called twisted) quantum field theory should be some transformation between quantum field theories, which themselves are symmetric monoidal functors out of a space-time category. In examples, the notion of natural transformation turns out to be too strong, making it necessary to relax it. In joint work with Theo Johson-Freyd we provide a framework for both lax and oplax transformations and their higher analogs, known as transfors, between strong  $(\infty, n)$ -functors. It is given by a double  $(\infty, n)$ -category built out of the target  $(\infty, n)$ -category that we call its (op)lax square, which governs the desired diagrammatics. Lax or oplax transfors then are functors into parts of the oplax square. Finally, I will explain how to use the (op)lax square to extend the construction of the higher Morita category of  $E_d$ -algebras in an  $(\infty, n)$ -category  $\mathcal{C}$  to an even higher level using the higher morphisms of  $\mathcal{C}$ .

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