KATE PONTO, University of Notre Dame, 255 Hurley Hall, Notre Dame, IN 46556
Fixed point theory and trace for bicategories

The Lefschetz Fixed Point Theorem associates to each self map of a compact smooth manifold an integer, the Lefschetz number, which is zero when the map has no fixed points. Unfortunately, this number can also be zero when the map has fixed points and all maps homotopic to it have fixed points. The Lefschetz number admits a refinement, called the Reidemeister trace, that (with some hypotheses) is zero if and only if the map is homotopic to a fixed point free map.

The Lefschetz Fixed Point Theorem has many proofs. One proof uses duality and trace in symmetric monoidal categories to prove a result that implies the Lefschetz Fixed Point Theorem: The Lefschetz number is equal to a geometrically described invariant, the index, that vanishes if the map has no fixed points.

The index also has a refinement and this invariant can be identified with the Reidemeister trace. This identification follows from duality and trace in bicategories with shadows, a generalization of duality and trace in symmetric monoidal categories.