

# *Goodwillie's calculus of functors*

## Abstract:

Goodwillie's calculus of functors provides a sequence of conceptual and computational tools allowing one to use the language of calculus, normally used to analyze smooth functions, to instead analyze functors between topological categories. There are corresponding notions of derivatives and Taylor expansions which can be used to approximate functors by 'polynomial' variants. One of the more surprising aspects of the theory is that the 'coefficients' of the Taylor tower are given by homology theories. In the case where we expand the identity functor on topological spaces this decomposition gives us a way to compute the homotopy groups of a space starting from these homology groups. Time permitting I'll discuss some interesting duality phenomena one uncovers when studying these expansions.