

The calculus of homotopy functors is an important topological tool that has been used to shed light on and make connections between fundamental structures in homotopy theory and K -theory. It has also inspired the creation of new types of functor calculi to tackle problems in algebra and topology. In this talk, I will begin by describing properties that a functor calculus should have, before looking at a particular functor calculus, the abelian functor calculus, that has its origins in the work of Eilenberg, Mac Lane, Dold, and Puppe. Using this calculus, one can define the analog of a “directional derivative” for functors of abelian categories. I will describe how this directional derivative is used to create a cartesian differential category from abelian functor calculus, and if time permits, discuss some related work on connections between functor calculus and differential categories.