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A classification of Taylor towers

Goodwillie's homotopy calculus provides a systematic way to approximate a functor F between the categories of based spaces and/or spectra with a 'Taylor tower' of polynomial functors. The layers in this tower can be described by a sequence of spectra which play the role of the derivatives of F (at the one-point object). The goal of this talk is to describe additional structure on these derivatives that specifies the extensions in the Taylor tower. This allows us to describe the polynomial approximations as derived mapping objects for coalgebras over certain comonads. I'll connect the structure of these comonads to that of right modules over various operads. This is all joint work with Greg Arone.