

1061-55-132

Dennis Sullivan*, SUNY, NY. *Algebraic Topology and Applied Math.* Preliminary report.

Computation in non linear problems often use cell decompositions, the boundary and coboundary operators, and chains and cochains. these are excellent discrete models of forms and vector fields and the classical operations of vector calculus. Difficulties arise from the algebraic structures related to wedge products , lie brackets and hodge star. There are discrete analogues of these but without some of the algebraic properties ...like the impossibility of a graded commutative cup product. Ideas from algebraic topology , like infinity algebras and rational homotopy theorie's notion of homotopy for dga maps can be brought to bear here. the program is to create effective algebraic models of the classical continuum algebraic operations for each cell decomposition of space. A key requirement is to have compatible maps between these structures for one decomposition and its subdivision. (Received April 11, 2010)