

TITLE : Cartan's magic without the formulas

ABSTRACT : The Cartan calculus concerns vector fields on a smooth variety X acting on differential forms via Lie derivative and contraction, with Cartan's magic formula expressing the relation between the two actions: Lie derivative is the graded commutator of the de Rham differential with contraction. On a smooth variety, the magic formula can be checked in local coordinates, while for singular schemes (and more general prestacks) it is necessary to work with the tangent complex, where it is no longer feasible to give explicit local formulas. Interpreting the magic formula as giving Griffiths transversality for the Gauss-Manin connection of the universal infinitesimal deformation of X , we are able to construct a formula-free, chain level Cartan calculus using the tangent complex of a singular scheme, and to establish the compatibility of this calculus with the noncommutative calculus of Hochschild cochains acting on Hochschild chains. This is joint work with Nick Rozenblyum.