

SINGULARITIES AND CHARACTERISTIC CLASSES FOR DIFFERENTIABLE MAPS

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This is a crash course on variants of *Thom polynomials* (Tp) for singularities of real and complex maps. By definition, Tp is just a universal expression of the fundamental class of the locus of singularities of maps with a prescribed type, and its origin goes back to R. Thom's talk in Strasbourg around 1957. The Tp theory has potential applications to the enumerative geometry from classics to modern in both contexts of algebraic geometry and differential topology (to say, currently, symplectic topology).

First we reivev a basic material of the theory for non-experts, especially graduate students. Then I'm planning to enter two different topics. The former one is *higher Thom polynomial*: we discuss in algebro-geometric context a universal expression of the Chern-Schwartz-MacPherson class of singular loci or discriminants of complex maps as a higher degree generalization of Tp . There are many interesting applications, e.g. for the Milnor number μ , and in a sense it relates to an equivariant version of the Milnor class. The second topic is about real singularities: we discuss local Vassiliev-type invariants for generic C^∞ maps in relation with Tp theory. I will mention a number of open problems.