SELF INTERSECTIONS OF CURVES AND SURFACES AND SOME CLASSICAL FORMULAS

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The Stückrad-Vogel self-intersection cycle of an irreducible and reduced curve in projective space gives a formula which relates the degree of the secant variety, the degree and the genus of the curve and the self-intersection numbers, the multiplicities and the number of branches of the curve at its singular points. From this formula one can deduce an expression of the difference between the genera of the curve, which generallizes the classical Max Noether's genus formula.

Also for projective surfaces the Stückrad-Vogel self-intersection cycle gives a relation between certain local and global numerical invariants. In the smooth case it gives a relation between the degrees of the tangent, the secant and the first polar variety, which generalizes classical relations between the so called elementary invariants of surfaces. In $\mathbb{P}^5$ one obtains the classical secant formula of Peters and Simonis. For singular surfaces this relation involves also the contributions of singularities to the self-intersection cycle and, in order to make it really effective, it is necessary to describe the movable part of the self-intersection cycle on the singular locus. In the talk the cycle will be described for particular classes of surfaces which are projections of scrolls.

[AMS1] Achilles, R.; Manaresi, M., Schenzel P.: *A degree formula for secant varieties of curves.* Preprint.

[AMS2] Achilles, R.; Manaresi, M., Schenzel P.: *On the self-intersection cycle of surfaces and some classical formulas for their secant varieties.* Forum Math. 23 (2011), 933-960