Mathematics, Statistics, and Computer Science **@ UIC**

Algebraic Geometry Seminar

Normal functions over locally symmetric varieties

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Abstract: An algebraic cycle homologous to zero on a variety leads to an extension of Hodge-theoretic data, and in a variational context to a family of extensions called a normal function. These may be viewed as ''horizontal'' sections of a bundle of complex tori, and are used to detect cycles modulo algebraic (or rational) equivalence. Conversely, the existence of normal functions can be used to predict that interesting cycles are present...or absent: a famous theorem of Green and Voisin states that for projective hypersurfaces of large enough degree, there are no normal functions (into the intermediate Jacobian bundle associated to these hypersurfaces) over any etale neighborhood of the coarse moduli space.

Inspired by recent work of Friedman-Laza on Hermitian variations of Hodge structure and Oort's conjecture on special (i.e. Shimura) subvarieties in the Torelli locus, R. Keast and I wondered about the existence of normal functions over etale neighborhoods of Shimura varieties. Here the function is supposed to take values in a family of intermediate Jacobians associated to a representation of a reductive group. In this talk I will explain our classification of the cases where a Green-Voisin analogue does *not* hold and where one therefore expects interesting cycles to occur, and give some evidence that these predictions might be ''sharp''.

Wednesday, October 21 at 4:00 PM in SEO 427