ODTU-Bilkent Algebraic Geometry

On the linear cycles conjecture

By

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Abstract: The classical Noether-Lefschetz theorem claims that a very general degree d>3 surface in P3 has Picard number one. The locus of surfaces with higher Picard rank is known as the Noether-Lefschetz locus, which is known to have a countable number of irreducible components. For d>4, it is classical result due independently to Green and Voisin, that the unique component of highest codimension corresponds to the locus of surfaces which contain lines.

The natural generalization of this question to higher dimensional hypersurfaces of the projective space is known as the "linear cycles conjecture", and remains open even for fourfolds. For surfaces, the proof is based in the fact that locally (analytically) one can parametrize each component by a Hodge locus, and then use the Infinitesimal Variation of Hodge Structure to compute (and bound) the dimension of its Zariski tangent space. A natural stronger version of the linear cycles conjecture is that the Hodge loci with maximal tangent space are those corresponding to linear cycles.

In this talk I will report on recent results disproving this conjecture for all degrees and dimensions.

Date: 3 April 2026, Friday
Time: 15:40 (GMT+3)
Place: Zoom

This is an online seminar. To request the Zoom link, please send a message to sertoz@bilkent.edu.tr