

DEFENSE OF THE DOCTORAL DISSERTATION

DEPARTMENT OF MATHEMATICS

“The Non-Lefschetz Locus of Lines and Conics”



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Time: 2:30 PM
Location: 125 Hayes-Healy Bldg

Examination Committee:
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Abstract:

An Artinian Algebra A has the *Weak Lefschetz Property* if there is a linear form, ℓ , such that the multiplication map $\times \ell$ has maximal rank for each degree. The *non-Lefschetz locus* is the set of linear forms for which maximal rank fails, and it has a natural scheme structure. Boij–Migliore–Miró-Roig–Nagel show that for a general Artinian complete intersection of height 3, the non-Lefschetz locus has the expected codimension. We want to address the same type of question for forms of degree 2 instead of lines. We define the *non-Lefschetz locus for conics* and show that for a general complete intersection of height 3, it has the expected codimension as a subscheme of \mathbb{P}^5 . The same does not hold for certain monomial complete intersections. Later, we will generalize the study of the non-Lefschetz locus to modules $M = H_*^1(\mathbb{P}^2, \mathcal{E})$ where \mathcal{E} is a vector bundle of rank 2. In this case, we show that the non-Lefschetz locus is exactly the set of jumping lines of \mathcal{E} , and the expected codimension is achieved when \mathcal{E} is general. In the case of conics, the same is not true: the non-Lefschetz locus of conics is a subset of the jumping conics, but it can be proper.