Structural Analysis on the Projective Space of $\mathbb{Z}_2^4$

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Given the projective space of $\mathbb{Z}_2^4$, there are fifteen projective points and thirty-five projective lines. The projective line complex admissibility problem seeks to describe and generalize the underlying structures that separate admissible (linearly independent) versus inadmissible (linearly redundant) complexes. Specifically, the line complex problem is used in the context of Radon Transforms over these projective points. This project addresses necessary conditions that contribute to admissible and inadmissible linear structures using discrete analysis, vector analysis, linear algebra, and discrete geometry. In particular, we are interested in generalized classes of minimally inadmissible collections of lines, their associated geometry, and its dependence on the "Even Incident Condition" (which is proven and explored in this project.)

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