

1074-00-336

Adonus L. Madison, Department of Mathematics, Lane College, Jackson, TN 38301, and
Junhua Wu*, Department of Mathematics, Lane College, Jackson, TN 38301. *On codes from
finite projective plane.*

Let \mathcal{O} be a conic in the classical projective plane $\text{PG}(2,q)$, where q is an odd prime power. With respect to \mathcal{O} , the lines of $\text{PG}(2,q)$ are classified as passant, tangent, and secant lines, and the points of $\text{PG}(2,q)$ are classified as internal, absolute and external points. The incidence matrices between the secant/passant lines and the external/internal points were used to produce several classes of structured low-density parity-check binary codes. In particular, the dimension formula for the binary code \mathcal{L} which arises as the \mathbb{F}_2 -null space of the incidence matrix between the passant lines and the internal points to \mathcal{O} has been conjectured. In this talk, we first explore geometric structures related to \mathcal{L} as well as some applications of \mathcal{L} , and then we prove the conjecture on the dimension of \mathcal{L} by using a combination of techniques from finite geometry and representation theory. (Received August 29, 2011)