1077-05-2248   **Josh Ducey*** (`duceyje@jmu.edu`), **Andries Brouwer** and **Peter Sin**. *The Smith Normal Form of the Incidence Matrix of Skew Lines in $PG(3, q)$.*

Let A be a matrix with rows and columns indexed by the lines in the finite projective space $PG(3, q)$. Set the (i, j)-entry of A to be 1 if line i and line j do not intersect, otherwise set it to be 0. Thus A is an incidence matrix of the skewness relation on the lines in $PG(3, q)$, and by the well-known Klein correspondence, A may also be viewed as an adjacency matrix for the non-collinearity graph on the points of the Klein quadric in $PG(5, q)$. This is a strongly regular graph.

In this talk the integer invariants of A are described, using the representation theory of the general linear group. This is some of the most recent progress made in the study of the incidence matrices of intersecting linear subspaces in a finite vector space. Joint work with Andries Brouwer and Peter Sin. (Received September 21, 2011)