SPACES OF CONSTANT RANK MATRICES OVER $GF(2)^*$

NIGEL BOSTON†

Abstract. For each $n$, we consider whether there exists an $(n + 1)$-dimensional space of $n$ by $n$ matrices over $GF(2)$ in which each nonzero matrix has rank $n - 1$. Examples are given for $n = 3, 4,$ and $5$, together with evidence for the conjecture that none exist for $n > 8$.

Key words. Constant rank, Matrices, Heuristics.

AMS subject classifications. 15A03, 15-04.

*Received by the editors September 11, 2009. Accepted for publication December 8, 2009. Handling Editor: Bryan L. Shader.
†Department of Mathematics, University of Wisconsin, Madison, WI 53706, USA (boston@math.wisc.edu). Supported by the Claude Shannon Institute, Science Foundation Ireland Grant 06/MI/006 and Stokes Professorship award, Science Foundation Ireland Grant 07/SK/11252b.