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**Daniel W Cranston\***, Department of Math and Applied Math, Virginia Commonwealth University, Richmond, VA 23284, and **Gexin Yu**. *Detecting a Machine Failure in a Network: Vertex Identifying Codes.*

Given a graph  $G$ , an identifying code  $C \subseteq V(G)$  is a vertex set such that for any two distinct vertices  $v_1, v_2 \in V(G)$ , the sets  $N[v_1] \cap C$  and  $N[v_2] \cap C$  are distinct and nonempty (here  $N[v]$  denotes a vertex  $v$  and its neighbors). We study the case when  $G$  is the infinite hexagonal grid  $H$ . Cohen et.al. constructed two identifying codes for  $H$  with density  $3/7$  and proved that any identifying code for  $H$  must have density at least  $16/39 \approx 0.410256$ . Both their upper and lower bounds were best known until now. Here we prove a lower bound of  $12/29 \approx 0.413793$ . (Received August 24, 2009)