

**Meeting:** 1003, Atlanta, Georgia, SS 24A, AMS Special Session on Design Theory and Graph Theory, I

1003-05-521      **Mark Ellingham\*** (mne@math.vanderbilt.edu), Department of Mathematics, 1326 Stevenson Center, Vanderbilt University, Nashville, TN 37240, and **Chris Stephens.** *The nonorientable genus of joins of complete graphs with large edgeless graphs.*

We show that for  $n = 4$  and  $n \geq 6$ ,  $K_n$  has a nonorientable embedding in which all the faces are hamilton cycles. Moreover, when  $n$  is odd there is such an embedding that is 2-face-colorable. Using these results we consider the join of an edgeless graph with a complete graph,  $\overline{K_m} + K_n = K_{m+n} - K_m$ , and show that for  $n \geq 3$  and  $m \geq n - 1$  its nonorientable genus is  $\lceil (m - 2)(n - 2)/2 \rceil$  except when  $(m, n) = (4, 5)$ . We then extend these results to find the nonorientable genus of all graphs  $\overline{K_m} + G$  where  $m \geq |V(G)| - 1$ . We provide a result that applies in some cases with smaller  $m$  when  $G$  is disconnected. We also discuss some problems with a paper of Wei and Liu [*Util. Math.* **59** (2001) 237–251] that claims to provide embeddings of  $K_n$  with hamilton cycle faces. (Received September 19, 2004)