

1021-05-98

**Jakob Jonsson\*** ([jakob@math.mit.edu](mailto:jakob@math.mit.edu)), Department of Mathematics, MIT 2-334, 77  
Massachusetts Avenue, Cambridge, MA 02139-4307. *On the Torsion Part of the Homology of the  
Matching Complex.*

The matching complex  $M_n$  is the simplicial complex of matchings in the complete graph  $K_n$ . We present several results about the torsion part of the homology of  $M_n$ : First, there is nonvanishing 3-torsion in  $\tilde{H}_d(M_n; \mathbb{Z})$  whenever  $\nu_n \leq d \leq \lfloor \frac{n-6}{2} \rfloor$ , where  $\nu_n = \lceil \frac{n-4}{3} \rceil$ . By results due to Bouc and to Shareshian and Wachs,  $\tilde{H}_{\nu_n}(M_n; \mathbb{Z})$  is a nontrivial elementary 3-group for almost all  $n$  and the bottom nonvanishing homology group of  $M_n$  for all  $n \neq 2$ . Second,  $\tilde{H}_d(M_n; \mathbb{Z})$  is a nontrivial 3-group whenever  $\nu_n \leq d \leq \lfloor \frac{2n-9}{5} \rfloor$ . Third, for each  $k \geq 0$ , there is a polynomial  $f_k(r)$  of degree  $3k$  such that the dimension of  $\tilde{H}_{k-1+r}(M_{2k+1+3r}; \mathbb{Z}_3)$ , viewed as a vector space over  $\mathbb{Z}_3$ , is at most  $f_k(r)$  for all  $r \geq 0$ . Fourth, using a result due to Andersen, we detect 5-torsion in the bottom nonvanishing homology of  $M_{14}$ . In addition, we present a few results of a similar flavor about the chessboard complex. (Received August 29, 2006)