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**John Asplund\*** (jsa0011@auburn.edu), **C. A. Rodger** and **Melissa Keranen**. *Enclosings of  $\lambda$ -fold 5-cycle systems.*

A  $k$ -cycle system of a multigraph  $G$  is an ordered pair  $(V, C)$  where  $V$  is the vertex set of  $G$  and  $C$  is a set of  $k$ -cycles, the edges of which partition the edges of  $G$ . A  $k$ -cycle system of  $\lambda K_v$  is known as a  $\lambda$ -fold  $k$ -cycle system of order  $v$ . A  $k$ -cycle system of  $\lambda K_v (V, C)$  is said to be enclosed in a  $k$ -cycle system of  $(\lambda + m)K_{v+u} (V \cup U, P)$  if  $C \subset P$  and  $u, m \geq 1$ . In this talk, some methods used to solve the difficult cases when  $u = 1$  and  $2$  will be discussed as well as future work involved with this research. (Received September 10, 2013)