Unparalleled even cycle systems

Tommaso Traetta*, Peter Danziger, Eric Mendelsohn, Ryerson University

A $2t$-*cycle system* of order v is a set $\mathcal{C}$ of cycles whose edges partition the edge-set of $K_v - I$ (i.e., the complete graph minus the 1-factor I). If $v \equiv 0 \pmod{2t}$, a set of $v/2t$ vertex-disjoint cycles of $\mathcal{C}$ is a *parallel class*. If $\mathcal{C}$ has no parallel classes, we call such a system *unparalleled*.
We show that there exists an unparalleled $2t$-cycle system of order v if and only if $v \equiv 0 \pmod{2t}$ and $v > 2t > 2$.

Keywords: cycle system, parallel class, unparalleled