On some cyclic and 1-rotational multigraph designs

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Let $\lambda K_v$ denote the complete $\lambda$-fold multigraph of order $v$. Let $\lambda$ and $n$ be positive integers such that $\lambda$ divides $2n$ let $G$ with $n$ edges be a subgraph of $\lambda K_{2n}$. We discuss some Rosa-type labelings of $G$ that lead to either cyclic $G$-decompositions of $\lambda K_{\frac{2nx}{n}+1}$ or to 1-rotational $G$-decompositions of $\lambda K_{\frac{2nx}{n}}$ for every positive integer $x$. We use these labelings to investigate $G$-decompositions where $\overline{G}$ is an even cycle with alternating double-edges.

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