On Cyclic and 1-Rotational $G$-Decompositions of 2-fold Complete Multigraphs

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Let $^2K_m$ denote the complete 2-fold multigraph of order $m$. Let $G$ of size $n$ be either a bipartite or an almost-bipartite subgraph of $^2K_{n+1}$. We discuss labelings of $G$ that lead to cyclic $G$-decompositions of $^2K_{nx+1}$ for every positive integer $x$. If in addition, $|V(G)| \leq n$, we discuss a labeling of $G$ that leads to 1-rotational $G$-decompositions of $^2K_{nx}$ for every positive integer $x$. We illustrate these results by finding such labelings for the graph $G(n)$ obtained from $C_n$ by replacing one edge with two parallel edges.