

DECOMPOSITION OF COMPLETE GRAPHS AND
COMPLETE BIPARTITE GRAPHS INTO COPIES OF P_n^3
OR $S_2(P_n^3)$ AND HARMONIOUS LABELING OF $K_2 + P_n$

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Abstract. In this paper, the graphs P_n^3 and $S_2(P_n^3)$ are shown to admit an α -valuation, where P_n^3 is the graph obtained from the path P_n by joining all the pairs of vertices u, v of P_n with $d(u, v) = 3$ and $S_2(P_n^3)$ is the graph obtained from P_n^3 by merging the centre of the star S_{n_1} and that of the star S_{n_2} respectively at the two unique 2-degree vertex of P_n^3 (the origin and terminus of the path P_n contained in P_n^3). It follows from the significant theorems due to Rosa [1967] and El-Zanati and Vanden Eynden [1996] that the complete graphs K_{2cq+1} or the complete bipartite graphs $K_{mq, nq}$ can be cyclically decomposed into the copies of P_n^3 or copies of $S_2(P_n^3)$, where c, m, n are arbitrary positive integer and q denotes either $|E(P_n^3)|$ or $|E(S_2(P_n^3))|$. Further, it is shown that join of complete graph K_2 and path P_n , denoted $K_2 + P_n$, for $n \geq 1$ is harmonious graph.

Key words: α -labeling, harmonious labeling, P_n^3 graphs, join, path.