PRIME LABELLING OF NEWLY CONSTRUCTED GRAPHS OBTAINED BY REPLACING EACH EDGE OF A STAR GRAPH BY A COMPLETE TRIPARTITE GRAPH

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The study of relatively prime numbers connecting with graphs is an active research area in Graph Theory. Prime labelling is a special case of graph labelling and our present work is focused on the prime labelling of newly constructed graphs obtained by replacing each edge of a star graph by a complete tripartite graph. A *prime labelling* of a simple graph G with n vertices is a labelling of vertices of G with distinct integers from the set $\{1, 2, \cdots, n\}$ in such a way that the labels of any two adjacent vertices are said to be relatively prime. If the greatest common divisor (gcd) of two integers is equal to 1, then those integers are relatively prime. A complete tripartite graph is a simple tripartite graph in which each vertex in one partite set is adjacent to all the vertices in the other two partite sets. In our work, we have proved that the graphs obtained by replacing every edge of a star graph $K_{1,n}$ by $K_{1,m,1}$ is a prime graph, where $n \geq 1$ and $m = 2,3$. These results are illustrated for some particular values of n and m. In future, we are planning to implement a computer program to generalize our present results to the graphs obtained by replacing each edge of a star graph $K_{1,n}$ by the tripartite graph $K_{1,m,1}$ ($n \geq 1, m \geq 4$), to the more generalized tripartite graphs of the form $K_{p,q,r}$ (for $p, q, r \in \mathbb{Z}^+$), and also to the multipartite graphs.

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