THE RAMSEY NUMBERS FOR A QUADRILATERAL VS. ALL GRAPHS ON SIX VERTICES.

CHULA J. JAYAWARDENE* AND CECIL C. ROUSSEAU
DEPARTMENT OF MATHEMATICAL SCIENCES
THE UNIVERSITY OF MEMPHIS

ABSTRACT. The Ramsey numbers $r(C_4, G)$ are determined for all graphs G of order six.

1. INTRODUCTION

For graphs G and H the Ramsey number $r(G, H)$ is the least number N such that in each two coloring $(R, B) =$ (red,blue) of the edges of K_N there is a red copy of G or a blue copy of H. All triangle-graph Ramsey numbers for connected graphs of order six were found by Faudree, Rousseau and Schelp [7]. Subsequently exact values of $r(C_3, G)$ have been determined for $|G| \leq 8$. See Radziszowski [17] for a survey. Much less research has been done on $r(C_4, G)$. It has been shown by J.A. Bondy and P. Erdős [1] that $r(C_n, K_r) = (n-1)(r-1)+1$, if $n \geq r^2-2$ and Clancy (see [2]) has found all Ramsey numbers for a quadrilaterals vs. all graphs on five vertices. Also $r(C_4, K_6) \geq 18$ has been proved by Exoo (see [6]) and the authors have proved that $r(C_4, K_6) = 18$ [15]. There are 112 connected graphs and 44 disconnected graphs on six vertices. A few of the first numbers could be found using Ramsey numbers of C_4 vs. trees and books(see [8] and [16]). Most of the later Ramsey numbers are found using [2],[12],[4], [13] and [11].

* The first author is also presently holding a lecturer position at the Department of Mathematics, University of Colombo, Sri Lanka.

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