

Ramsey Numbers $r(C_5, G)$ for all Graphs G of Order Six

Chula J. Jayawardene* and Cecil C. Rousseau

Department of Mathematical Sciences

The University of Memphis

Memphis, TN 38152

ABSTRACT. The Ramsey numbers $r(C_5, G)$ are determined for all graphs G of order six.

1 Introduction

Ramsey numbers for small graphs have been studied assiduously since the earliest work on this subject by Chvátal and Harary [4]. For a constantly updated compilation of known results, the reader is referred to the useful electronic survey prepared by Radziszowski [14]. Various contributions have involved creating complete catalogues for limited families of graphs. An early effort in this direction was that of Clancy, who gave all but five Ramsey numbers $r(F, G)$ with $|V(F)| \leq 4$ and $|V(G)| \leq 5$ [6]. Additional diagonal Ramsey numbers for graphs of order five were found by Harborth and Mengersen [9]. Hendry extended Clancy's catalogue to cover, with six exceptions, all pairs where both F and G are of order at most five [10]. Another approach involves finding for some fixed graph F all Ramsey numbers $r(F, G)$ for graphs G of limited order. All triangle-graph Ramsey numbers for connected graphs of order six were found in [7]. By standard methods, Schelten and Schiermeyer found $r(K_3, G)$ for all but 39 of the 853 connected graphs G of order seven [17]. Using a computer, Brinkmann independently determined $r(K_3, G)$ for connected graphs of order seven, and he extended the calculations to cover connected graphs of order eight [3]. Brandt, Brinkmann, and Harmuth have now determined $r(K_3, G)$ for all connected graphs of order nine [2]. The authors established that

*The author also holds a lecturer position at the Department of Mathematics, University of Colombo, Sri Lanka.