PBIB-DESIGNS WITH $m = 1, 2, 3, 4$ AND $\lfloor \frac{p}{2} \rfloor$ ASSOCIATED CLASSES ARISING FROM γ_{cc}-SETS OF SOME SPECIAL KIND OF GRAPHS

B. Chaluvaraju and N. Manjunath

Department of Mathematics,
Bangalore University, Jnana Bharathi Campus,
BENGALURU - 560 056, INDIA.
E-mail: bchaluvaraju@gmail.com, manjubub@gmail.com

Dedicated to Prof. A.M. Mathai on his 80th birth anniversary

Abstract: A set D of vertices of a connected graph $G = (V, E)$ is a co-connected dominating set if every vertex not in D is adjacent to some vertex in D and the subgraph induced $\langle V - D \rangle$ is connected. The co-connected domination number $\gamma_{cc}(G)$ is the minimum cardinality of a co-connected dominating set. A γ_{cc} - set is a minimum co-connected dominating set of G. In this paper, we obtain the Partially Balanced Incomplete Block (PBIB) - designs with $m = 1$, 2, 3, 4 and $\lfloor \frac{p}{2} \rfloor$ associated classes arising from γ_{cc} - sets of some special types of graphs.

Keywords and Phrases: Association schemes; Partially balanced incomplete block designs; Co-connected dominating sets.

2010 Mathematics Subject Classification: Primary 05C51, 05E30, 05C69.

1. Introduction

By a graph $G = (V, E)$ we mean a finite, connected, undirected graph, without loops or multiple edges. As usual $p = |V|$ and $q = |E|$ denote the number of vertices and edges of a graph G, respectively. Any undefined term in this paper may be found in Harary [5].

Bose and Nair [3] introduced a class of binary, equireplicate and proper designs, which are called Partially Balanced Incomplete Block (PBIB)- Designs. This design is classified into different types on the basis of their association schemes. In brief, they can be grouped as PBIB(2)-Designs, PBIB(3)-Designs and higher associate-class PBIB-Designs. In each of the above mentioned groups there are further sub groups based on the types of the underlying association scheme.