South East Asian J. of Mathematics and Mathematical Sciences
Vol. 16, No. 1 (2020), pp. 157-170

ISSN (Online): 2582-0850

ISSN (Print): 0972-7752

GRAPH THEORETIC PARAMETERS ASSOCIATED WITH PBIB DESIGN VIA PARTIAL GEOMETRIES OF GENERALIZED POLYGON

B. Chaluvaraju, Sunilkumar M. Hosamani* and S. A. Diwakar

Department of Mathematics,
Bangalore University, Jnana Bharathi Campus,
Bengaluru-560056, INDIA

E-mail : bchaluvaraju@gmail.com, dsatumkur@gmail.com

*Department of Mathematics,
Rani Channamma University, Belagavi - 591156, INDIA

E-mail : sunilkumar.rcu@gmail.com

(**Received:** *Oct. 09, 2019* **Accepted:** *Dec. 15, 2019* **Published:** *Apr. 30, 2020)*

Abstract: Due to Feit and Higman [12], the (thick) generalized n-gons exist only for $n \in \{2, 3, 4, 6, 8\}$ and are apparently quite rare for $n = 6$ or 8. By virtue of the above fact, in this article, we investigate the generalized polygons which are strongly regular graphs and pseudo geometric graphs. Also, we obtain the parameters of partial geometry and partially balanced incomplete block (PBIB) designs with association scheme arising from classical graph theoretic parameters (covering, independence, domination and neighborhood number) on generalized polygons.

Keywords and Phrases: Graph, partial geometry, generalized polygons, pseudogeometric graph, partially balanced incomplete block design.

2010 Mathematics Subject Classification: 05E30, 51E12, 51E14.

1. Introduction

Let a graph $G = (V, E)$ be finite, simple, undirected, without loops and multiple lines. In general, we use $\langle S \rangle$ to denote the sub graph induced by the set of points S. Also, by recalling some classical parameters in graph theory as follows: