Notation

We use standard graph theory terminology and notation as given in [3],[9] and [25]. For easy reference, we give below a few definitions and some notations which we have frequently used.

V(G) Vertex set of G
E(G) Edge set of G
n Number of vertices
m Number of edges
N(v) Set of vertices adjacent to v
d_G(v) Degree of a vertex v in G = number of edges incident with v
δ Minimum degree
Δ Maximum degree
i-vertex A vertex of degree i
n_j Number of vertices of degree j
π(G) Degree sequence of G = 1^{n_1}2^{n_2}...\Delta^{n_{\Delta}}, where if n_j = 0, then the factor j^{n_j} is customarily omitted in π(G)
[S,T]_G Set of edges in G with one end in S and the other in T, where S \cap T = \emptyset
[S]_G Subgraph of G, induced by S \subseteq V(G)
||S|| Number of edges in [S]
χ′ Edge-chromatic number
C(v) Set of colours represented at v in an edge colouring of a graph
\overline{C}(v) Set of colours absent at v in an edge colouring of a graph
N_k The set of all vertices of degree k, 2 \leq k \leq \Delta - 1
M The set of all vertices of degree Δ
Explanation

Clearly, \([S, T]_G = [T, S]_G\). However, throughout the thesis we follow the convention that when we write \(|[S, T]_G| (| [T, S]_G|)\), it means that we have estimated the number of edges in \([S, T]_G\) by looking at the degrees of the vertices in \(S\)(respectively \(T\)).

Definitions

Order(G) Number of vertices in a graph G
Size(G) Number of edges in a graph G
Major vertex A vertex \(v\) with \(d(v) = \Delta\)
Minor vertex A vertex \(v\) with \(d(v) < \Delta\)
Class 1 graph A graph \(G\) with \(\chi'(G) = \Delta(G)\)
Class 2 graph A graph \(G\) with \(\chi'(G) > \Delta(G)\)
Critical graph A graph \(G\) is (edge-chromatic) critical if \(G\) is connected, of class 2 and \(\chi'(G - e) < \chi'(G)\) for every edge \(e\) of \(G\)
\(\Delta\)-critical graph A critical graph with maximum degree \(\Delta\).