# Spectral conditions of complement for some graphical properties

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**Abstract:** In this paper, we give the sufficient conditions for a graph with large minimum degree to be $s$-connected, $s$-edge-connected, $\beta$-deficient, $s$-path-coverable, $s$-Hamiltonian and $s$-edge-Hamiltonian in terms of spectral radius of its complement.

**Keywords:** Spectral radius; Minimum degree; Complement; Stability

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## 1 Introduction

Let $G = (V, E)$ be a simple graph of order $n$ with vertex set $V = V(G) = \{v_1, v_2, \ldots, v_n\}$ and edge set $E = E(G)$. The complement of $G$ is denoted by $\overline{G}$. A regular graph is one whose vertices all have the same degrees, and semi-regular bipartite graph is a bipartite graph for which the vertices in the same part have the same degrees. Let $K_n$, $O_n$ denote the complete graph, the empty graph on $n$ vertices, respectively. For two disjoint graphs $G_1$ and $G_2$, the union of $G_1$ and $G_2$, denoted by $G_1 + G_2$, is defined as $V(G_1 + G_2) = V(G_1) \cup V(G_2)$ and $E(G_1 + G_2) = E(G_1) \cup (G_2)$; and the join of $G_1$ and $G_2$, denoted by $G_1 \vee G_2$, is

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