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ON SPECTRA OF VARIANTS OF THE CORONA OF TWO GRAPHS AND SOME NEW EQUIENERGETIC GRAPHS

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Abstract

Let G and H be two graphs. The join $G \vee H$ is the graph obtained by joining every vertex of G with every vertex of H. The corona $G \circ H$ is the graph obtained by taking one copy of G and $|V(G)|$ copies of H and joining the i-th vertex of G to every vertex in the i-th copy of H. The neighborhood corona $G \star H$ is the graph obtained by taking one copy of G and $|V(G)|$ copies of H and joining the neighbors of the i-th vertex of G to every vertex in the i-th copy of H. The edge corona $G \diamond H$ is the graph obtained by taking one copy of G and $|E(G)|$ copies of H and joining each terminal vertex of i-th edge of G to every vertex in the i-th copy of H. Let G_1, G_2, G_3 and G_4 be regular graphs with disjoint vertex sets. In this paper we compute the spectrum of $(G_1 \vee G_2) \cup (G_1 \star G_3)$, $(G_1 \vee G_2) \cup (G_2 \star G_3) \cup (G_1 \star G_4)$, $(G_1 \vee G_2) \cup (G_1 \circ G_3)$, $(G_1 \vee G_2) \cup (G_2 \circ G_3) \cup (G_1 \circ G_4)$, $(G_1 \vee G_2) \cup (G_1 \diamond G_3)$, $(G_1 \vee G_2) \cup (G_2 \diamond G_3) \cup (G_1 \diamond G_4)$, $(G_1 \vee G_2) \cup (G_2 \circ G_3) \cup (G_1 \star G_3)$, $(G_1 \vee G_2) \cup (G_2 \circ G_3) \cup (G_1 \diamond G_4)$ and $(G_1 \vee G_2) \cup (G_2 \star G_3) \cup (G_1 \diamond G_4)$. As an application, we show that there exist some new pairs of equienergetic graphs on n vertices for all $n \geq 11$.

Keywords: spectrum, corona, neighbourhood corona, edge corona, energy of a graph, equienergetic graphs.

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