

M-join of graphs and its spectra

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Abstract

The study of various spectra of graphs is a fundamental topic of research in spectral graph theory as several structural properties a graph can be explored through the knowledge of its spectra. In graph theory, several graph operations have been defined for various purposes. It is a common problem in spectral graph theory that to what extent the spectrum of a graph constructed using graph operations can be described in terms of the spectrum of the constituting graph(s). Over the past five decades, considerable attention has been paid by the researchers on the spectra of graphs obtained using some graph operations such as the disjoint union, the complement, the join, the corona, the Cartesian product, the strong product, the Kronocker product, the NEPS. In specific, there are several variants of join of graphs and corona of graphs have been defined and its spectra have been studied. In this talk, we explore the construction of *M*-join of graphs, and show that all the graph products are particular cases of this construction. Also several new graph products can be defined from this construction. We obtain the various spectra of these graph products and show that several existing results on the spectra of product of graphs can be deduced from our results.