PREFACE

Preface

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Graph theory is a young but rapidly maturing subject. It is an important branch of modern mathematics in the information age with applications in a range of disciplines such as computer science, communication, complex systems, combinatorial optimization, chemistry, biology, to name only a few. Over the years the Bulletin of the Malaysian Mathematical Sciences Society has published a number of papers in graph theory, making it a noteworthy forum for researchers in the area. The Bulletin constantly receives high-quality submissions in graph theory as well as other mathematical areas. To reflect recent developments in graph theory in a timely manner and also to reduce the backlog of the Bulletin, we decided to edit this special issue on graph theory.

This collection provides the graph theory community with twenty-six papers on a diversity of hot topics of current research interests. According to the topics covered, we have grouped the papers into five parts. The first contains papers of algebraic flavor, starting with a paper addressing graphs of ideals of a commutative ring. The next contribution in this part discusses the cyclic edge-connectivity of vertex-transitive graphs, double-orbit graphs, and regular double-orbit graphs. This is followed by two papers on Cayley graphs and two more papers on Laplacian spectra of graphs.

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The second part of the present collection is filled with papers from metric graph theory. One of the deepest topics studied in this area is the Gromov hyperbolicity, and the first paper in this part gives a characterization of the hyperbolicity of periodic graphs. In the subsequent paper the diameter of the neighborhood graph is studied in terms of the diameter of the original graph. Then an axiomatic approach to metric properties is taken by characterizing all graphs for which the induced path transit function satisfies the so-called Pasch axiom. The last three papers on metric graph theory are from one of the most active related areas, namely the theory of the metric dimension. In these papers three variants of the metric dimension are studied: the k -metric dimension, the local metric dimension, and the simultaneous strong metric dimension, respectively.

The third part of this collection consists of four papers on graph domination. The first studies total domination vertex critical graphs, while the second is concerned with 2-rainbow domination and independent 2-rainbow domination. The last two papers on graph domination investigate the non-isolating bondage in graphs and the bondage number of Mycielski graphs, respectively.

The fourth part is devoted to graph coloring and independence. This part also contains four papers, of which the first two investigate neighbor sum distinguishing edge colorings and equitable colorings, respectively. The last two papers are concerned with the third largest number of maximal independent sets in graphs and maximum induced matchings in hexagonal graphs, respectively.

The special issue is concluded with six papers that cover additional themes of graph theory. The first two of them investigate signed graphs with a focus on signed line graphs. In the subsequent paper fractional critical deleted graphs are studied. This is followed by a paper on the harmonic index, which is a degree-based graph invariant. The fifth paper in the last part investigates embeddings of arbitrary trees into graceful trees, while the last paper is concerned with the intrinsic structure of iterated line graphs.

We hope that this collection will attract a wide audience of researchers in graph theory and related disciplines. Enjoy reading!