

ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON
RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

April 23-24-25, 2026 | Marrakech, Morocco



About Indices on Graphs, Digraphs and Tournaments

Communication Info

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Keywords:

- (1) Decomposability index
- (2) Estrada Index
- (3) Sombor index
- (4) Simplicity index
- (5) Wiener index
- (6) Digraphs

Abstract

Graph theory constitutes a fundamental tool for modeling and analyzing complex discrete structures arising in various scientific fields. This work presents a comprehensive and structured survey of indices on graphs, digraphs, and tournaments. We begin by recalling the fundamental notions and basic properties of graphs and digraphs. We then review several classical and recent indices, emphasizing their mathematical properties, interrelations, and applications. Finally, we focus on tournaments, discussing their structural aspects and introducing the main indices associated with them, along with illustrative examples. The objective of this study is to provide a unified and in-depth perspective on these indices, highlighting their theoretical significance and practical relevance in interdisciplinary domains such as chemistry, biology, and network analysis. Furthermore, this work aims to stimulate further research by offering a clear synthesis of existing results and identifying potential directions for future investigations in the theory of graph and tournament indices.

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