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Chapter 4
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Topological Indices of Transformation Graphs of a Compliment Graph: A Recent Study

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ABSTRACT

The mathematical and computational chemistry involving the computation of topological indices is a trending research topic because of the importance of topological index in the chemical graph theory. Topological index is used to predict bioactivity of the molecular graphs of chemical compounds in the chemical graph theory. Hence, we obtain an expression of Randic index and sum-connectivity index of Transformation graphs of a compliment graph. We also extend the same for regular graph.

Keywords: Randic index; sum-connectivity index; transformation graphs; compliment graph; regular graph.

2010 MSC Classification: 97K30, 05C07.

1 INTRODUCTION

Mathematical chemistry is a branch of theoretical chemistry in which chemical structure can be predicted by using different mathematical tools. Chemical graph theory is one of the tool, which implements graph theory to study mathematical modeling of chemical aspects. The mathematical and computational chemistry involving the computation of topological indices is a trending research topic because of the importance of topological index in the chemical graph theory. Topological index is used to predict bioactivity of the molecular graphs of chemical compounds in the chemical graph theory. The topological indices are a numerical parameter mathematically obtained from the graph representing a molecule. Topological indices on vertex degree namely Randic index and sum-connectivity indices are more investigated topological index [1, 2].

Throughout the paper $G(V, E)$ is a finite, undirected, simple graph with the nonempty vertex set V and edge set E of G. An order of G is the number of elements of V, represented as $|V| = n$ and the size of G is the number of elements of E, represented as $|E| = m$. The degree of a vertex v is represented as $d_G(v)$, uv represents an edge between the two vertices u and v. Let $\overline{G}$ be the compliment of a graph G. For undefined terminologies we refer to [3].

Definition: Randic index is defined as $R(G) = \sum_{uv \in E}[\sqrt{d_G(u) \times d_G(v)}]^{-1}$
Definition: Sum-connectivity index is defined as $SCI(G) = \sum_{uv \in E}[\sqrt{d_G(u) + d_G(v)}]^{-1}$

Definition: [4] For a graph $G(V, E)$ of order $n \geq 3$, let the variables x, y, z takes the values $+$ or $-$. The transformation graph G^{xyz} is a graph having $V(G) \cup E(G)$ as a vertex set, and for $\alpha, \beta \in V(G) \cup E(G)$, α and β are adjacent in G^{xyz} if and only if

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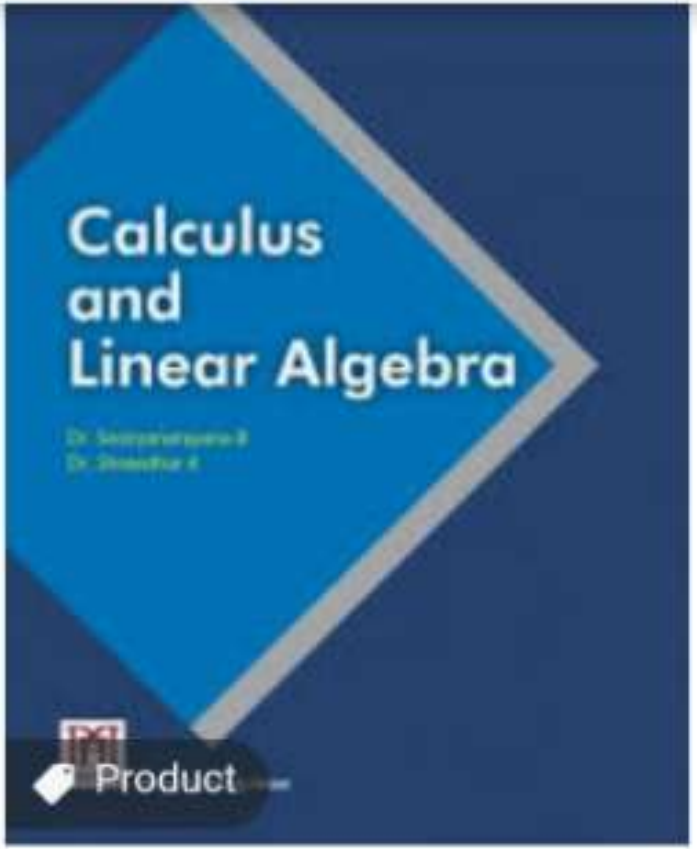

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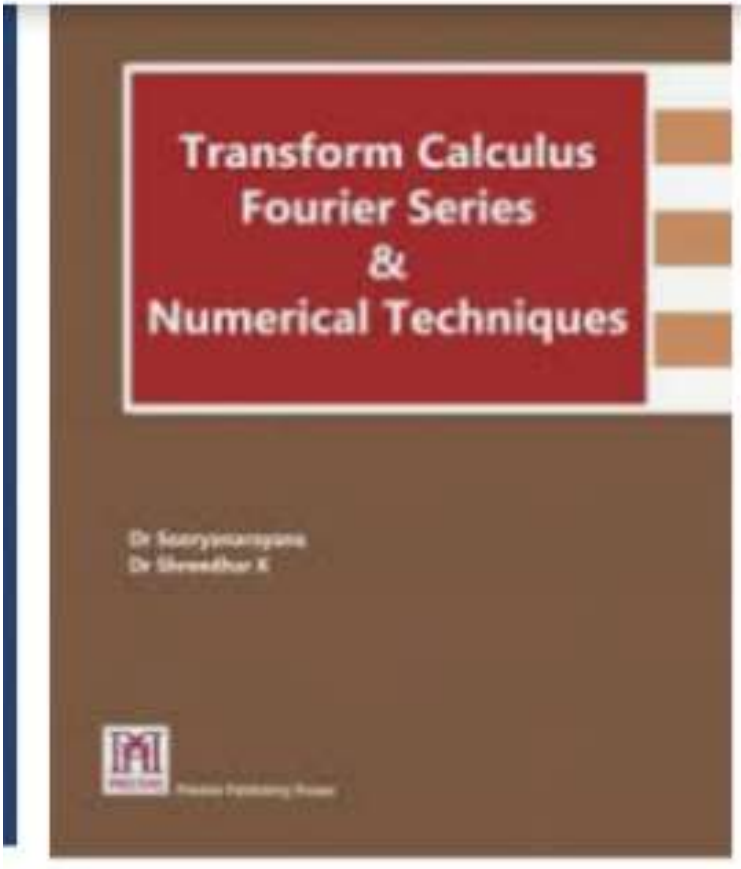

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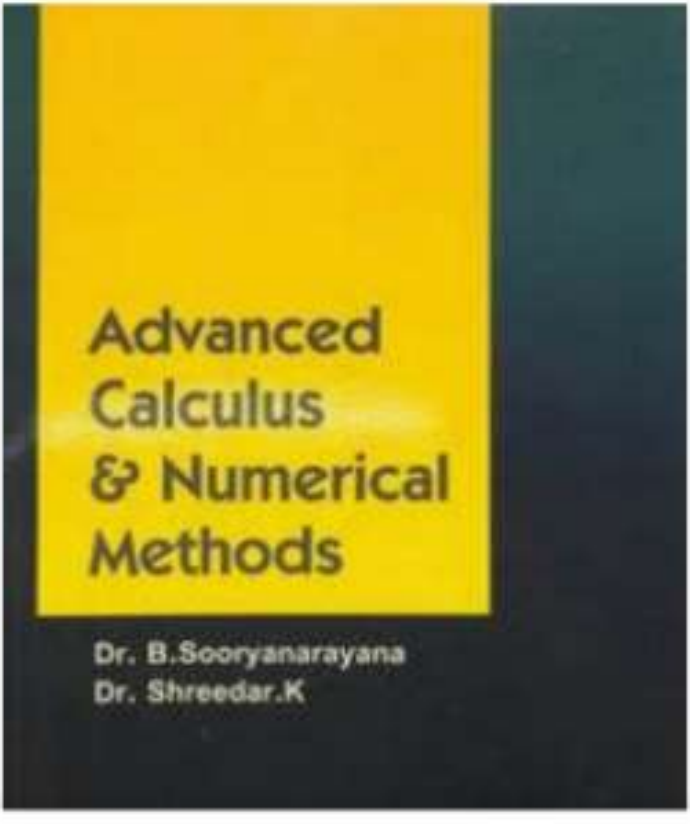
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