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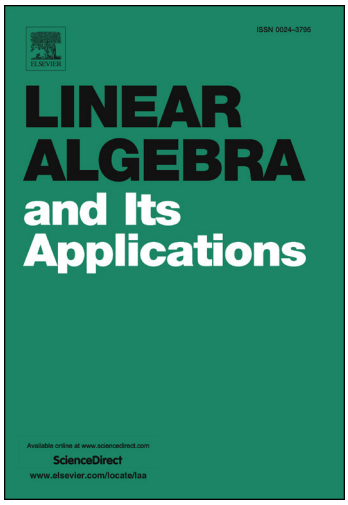

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Enide Andrade, Pamela Pizarro, María Robbiano, B. San Martín, Katherine Tapia

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Applications of Estrada Indices and Energy to a family of compound graphs

Enide Andrade*

CIDMA-Center for Research and Development in Mathematics and Applications
Departamento de Matemática, Universidade de Aveiro, 3810-193, Aveiro, Portugal.

Pamela Pizarro, María Robbiano, B. San Martín and Katherine Tapia

Departamento de Matemáticas, Facultad de Ciencias. Universidad Católica del Norte.
Av. Angamos 0610 Antofagasta, Chile.

Abstract

To track the gradual change of the adjacency matrix of a simple graph $\mathcal{G}$ into the signless Laplacian matrix, V. Nikiforov in [36] suggested the study of the convex linear combination A_α (α-*adjacency matrix*),

$$A_\alpha(\mathcal{G}) = \alpha D(\mathcal{G}) + (1-\alpha) A(\mathcal{G}),$$

for $\alpha \in [0,1]$, where $A(\mathcal{G})$ and $D(\mathcal{G})$ are the adjacency and the diagonal vertex degrees matrices of $\mathcal{G}$, respectively. Taking this definition as an idea the next matrix was considered for $a, b \in \mathbb{R}$. The matrix $A_{a,b}$ defined by

$$A_{a,b}(\mathcal{G}) = aD(\mathcal{G}) + bA(\mathcal{G}),$$

extends the previous α-adjacency matrix. This matrix is designated the (a,b)-*adjacency matrix of* $\mathcal{G}$. Both adjacency matrices are examples of universal matrices already studied by W. Haemers. In this paper, we study the (a,b)-adjacency spectra for a family of compound graphs formed by disjoint balanced trees whose roots are identified to the vertices of a given graph.

*Corresponding author

Email addresses: enide@ua.pt (Enide Andrade), ppizarro01@ucn.cl,mrobbiano@ucn.cl,sanmarti@ucn.cl,ktapia@ucn.cl (Pamela Pizarro, María Robbiano, B. San Martín and Katherine Tapia)