Editorial

Milica Anđelić, Renata Del-Vecchio, and Vilmar Trevisan

Editorial to Special issue "Workshop on Spectral Graph Theory 2023 – In honor of Prof. Nair Abreu"

This special issue of **Special Matrices** is dedicated to the *Workshop on Spectral Graph Theory 2023 (WSGT 2023)*, a conference in honor of Nair Abreu for her (70+3)rd birthday, held in Niterói, Rio de Janeiro, Brazil, from October 24 to 27, 2023. This workshop was attended by eminent researchers in the field, in addition to attracting young researchers and graduate students. In total, 75 researchers from Brazil, Germany, The Netherlands, Denmark, France, USA, Canada, India, China, Argentina, Chile, and Uruguay participated in this meeting.

It was organized by the TEG-Brazil (acronym for Spectral Graph Theory in Portuguese). This group started in 2002 led by Professor Nair Abreu and it was initially composed by mathematicians, computer scientists and students from several institutions in Rio de Janeiro and Niterói. Shortly afterwards, a new SGT research center was created in Porto Alegre, south of Brazil, with strong interaction with the Rio group. Today we have researchers in this area spread across the four corners of the country. This remarkable growth of SGT is due in great deal to the diligent work of Nair Abreu.

Professor Nair Abreu is the pioneer researcher in Spectral Graph Theory in Brazil. Her interest on that theme was initiated in 2001, when she attended an important event in Scotland: *Euro Workshop on Algebraic Graph Theory*. Many of the researchers that Nair met on that occasion, later visited Brazil, invited by her. Among the papers published by Nair Abreu, we highlight the seminal "Old and new results on algebraic connectivity of graphs," a mandatory reference for algebraic connectivity, an important topic in SGT.

In 2008, Professor Nair Abreu organized the *Workshop on Spectral Graph Theory, WSGT in Rio* 2008. This was a memorable event that brought together the most important researchers in the field, including the pioneers Dragos Cvetković and Miroslav Fiedler. More recently, in 2019 Professor Nair lead the organization of *the 22st Conference of the International Linear Algebra Society (ILAS 2019)* in Rio de Janeiro. This is the most important event organized by the International Linear Algebra Society and was the first time that happened in Latin America.

The SGT Brazilian community is very grateful for her contributions, generosity and kindness. To conclude, we give the floor to Nair, borrowing the following sentence from her speech:

> *During this period of life, I had the joy to meet new colleagues, students and friends. It's funny to imagine that such concrete and solid friendships are born from abstract properties!*

This special issue comprises the following articles:
1. "Eigenvalues of complex unit gain graphs and gain regularity" by Maurizio Brunetti, https://doi.org/10.1515/spma-2024-0005.

Milica Anđelić: Department of Mathematics, College of Science, Kuwait University, Al-Shadadiyah, Kuwait, e-mail: milica.andelic@ku.edu.kw
Renata Del-Vecchio: Instituto de Matemática e Estatística, UFF, Niterói, RJ, Brazil, e-mail: rrdelvecchio@id.uff.br
Vilmar Trevisan: Instituto de Matemática e Estatística, UFRGS, Porto Alegre, Brazil, e-mail: trevisan@mat.ufrgs.br

2. "Note on the product of the largest and the smallest eigenvalue of a graph" by Aida Abiad, Cristina Dalfó, Miquel Àngel Fiol, https://doi.org/10.1515/spma-2024-0008.

3. "Four-point condition matrices of edge-weighted trees" Ali Azimi, Rakesh Jana, Mukesh K. Nagar, Sivaramakrishnan Sivasubramanian, https://doi.org/10.1515/spma-2024-0011.

4. "On the Laplacian index of tadpole graphs" by Rodrigo O. Braga, Bruno S. Veloso, https://doi.org/10.1515/spma-2024-0019.

5. "Signed graphs with strong (anti-)reciprocal eigenvalue property" by Francesco Belardo, Callum Huntington, https://doi.org/10.1515/spma-2024-0017.

6. "Some results involving the A_α-eigenvalues for graphs and line graphs" by João Domingos G. da Silva Júnior, Carla Silva Oliveira, Liliana Manuela G. C. da Costa, https://doi.org/10.1515/spma-2024-0016.

7. "A generalization of the Graham-Pollak tree theorem to even-order Steiner distance" by Joshua Cooper, Gabrielle Tauscheck, https://doi.org/10.1515/spma-2024-0018.

8. "Nonvanishing minors of eigenvector matrices and consequences" by Tarek Emmrich, https://doi.org/10.1515/spma-2024-0020.

9. "A linear algorithm for obtaining the Laplacian eigenvalues of a cograph" Guantao Chen, Fernando C. Tura, https://doi.org/10.1515/spma-2024-0024.

10. "On the minimum spectral radius of connected graphs of given order and size" by Sebastian M. Cioaba, Vishal Gupta and Celso Marques, https://doi.org/10.1515/spma-2024-0027.

11. "Graphs whose Laplacian eigenvalues are almost all 1 or 2" by Shanshan Xu and Ali Mohammadian, https://doi.org/10.1515/spma-2024-0015.

12. "A Laplacian eigenbasis for threshold graphs" by Rafael R. Macharete, Renata R. Del-Vecchio, Heber Teixeira, Leonardo de Lima, https://doi.org/10.1515/spma-2024-0029.

13. "Selected open problems in continuous-time quantum walks" by Gabriel Coutinho, Krystal Guo, https://doi.org/10.1515/spma-2024-0025.