

## Generalized approximating class of sequences and asymptotic block structures with rectangular Toeplitz blocks.

*Tuesday, 21 January 2025 10:00 (20 minutes)*

In the talk, the problem of identifying the distribution in the Weyl sense (singular values and eigenvalues) is treated, when block matrix-sequences with rectangular Toeplitz blocks are considered. The case of sequences whose block sizes tend to rational numbers is of more classical flavour and is concisely introduced.

Using recent results regarding the notion of generalized approximating class of sequences (g.a.c.s), a symbol for such sequences is computed when the proportions between the different block sizes tend to irrational numbers. In doing so, the flexibility of the idea of g.a.c.s. is emphasized, when dealing with integro-differential equations on unbounded or moving domains.

Theoretical results also suggest practical preconditioning strategies for designing fast preconditioned Krylov solvers for the related large linear systems.

References:

1. Adriani A., Schiavoni-Piazza A.J.A., Serra-Capizzano S., "Blocking structures, g.a.c.s. approximation, and distributions." Special Volume in Memory of Prof. Nikolai Vasilevski (2024), to appear.
2. Adriani A., Schiavoni-Piazza A.J.A., Serra-Capizzano S., "Revisiting the notion of approximating class of sequences for handling approximated PDEs on moving or unbounded domains." Electronic Transactions on Numerical Analysis (2024), to appear.
3. Barakitis N., Ferrari P., Furci I., Serra-Capizzano S., "An extradimensional approach for distributional results: the case of 2x2 block Toeplitz Structures." Springer Proceedings on Mathematics and Statistics (2024), to appear.
4. Furci I., Adriani A., Serra-Capizzano S., "Block structured matrix-sequences and their spectral and singular value distributions: a general theory." In arXiv:2409.06465 (2024)

**Primary authors:** SCHIAVONI PIAZZA, Alec Jacopo Almo (SISSA); Dr ADRIANI, Andrea (University of Roma Tor Vergata); SERRA-CAPIZZANO, Stefano (Università degli studi dell'Insubria)

**Presenter:** SCHIAVONI PIAZZA, Alec Jacopo Almo (SISSA)

**Session Classification:** Morning Session III