

Reduced GLT sequences and Applications

The spectral analysis of matrix-sequences generated by the discretization and numerical approximation of partial differential equations, in case the domain is a generic Peano–Jordan measurable set, can be performed through the lens of generalized locally Toeplitz (GLT) theory.

In fact, it is observed that such matrix-sequences often present a spectral symbol, a measurable function describing the asymptotic behaviour of the eigenvalues.

When the domain is a hypercube, the classic GLT sequences are enough to determine the symbol, but in case of generic domains, a different kind of matrix-sequences and theory has to be formalized.

We thus develop in full detail the theory of Reduced GLT sequences and symbols, presenting some applications to finite differences and finite elements discretizations of PDEs.

In particular, we show how the theory of Reduced GLT can be exploited when the discretization grid is a mesh-up of multiple grids with different degrees of fineness on a partition of the domain.

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