

THE GLT CLASS AS A GENERALIZED FOURIER ANALYSIS AND APPLICATIONS

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Recently, the class of Generalized Locally Toeplitz (GLT) sequences has been introduced [1, 2] as a generalization both of classical Toeplitz sequences and of variable coefficient differential operators and, for every sequence of the class, it has been demonstrated that it is possible to give a rigorous description of the asymptotic spectrum in terms of a function (the symbol) that can be easily identified.

This generalizes the notion of a symbol for differential operators (discrete and continuous) or for Toeplitz sequences for which it is identified through the Fourier coefficients and is related to the classical Fourier Analysis.

The GLT class has nice algebraic properties and indeed it has been proven that it is stable under linear combinations, products, and inversion when the sequence which is inverted shows a sparsely vanishing symbol (sparsely vanishing symbol = a symbol which vanishes at most in a set of zero Lebesgue measure). Furthermore, the GLT class virtually includes any approximation of integro differential equations by local methods (Finite Difference, Finite Element, Isogeometric Analysis and, based on this, we demonstrate that our results on GLT sequences can be used in various directions.

References

- [1] C. Garoni, S. Serra-Capizzano. *The theory of Generalized Locally Toeplitz sequences: theory and applications - Vol. I* SPRINGER - Springer Monographs in Mathematics, Cham (2017).
- [2] C. Garoni, S. Serra-Capizzano. *The theory of Generalized Locally Toeplitz sequences: theory and applications - Vol. II* SPRINGER - Springer Monographs in Mathematics, Cham (2018).