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MODELING SEISMIC WAVE PROPAGATION IN TURKIYE USING EXPONENTIAL-TYPE SAMPLING KANTOROVICH OPERATORS

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ABSTRACT

In this talk, we focus on modeling seismic wave propagation in Türkiye using sampling-type operators. Seismic wave models are constructed based on the Local Magnitude (ML) scale derived from data provided by the Turkish National Seismic Network (TNSN), together with a third-order Mellin-spline kernel. The performance of the proposed Kantorovich-type operators is evaluated in comparison with Durrmeyer-type operators. Numerical results and graphical analyses indicate that the Kantorovich-type approach provides lower Mean Square Error (MSE) values and demonstrates superior performance, particularly in the filtering and reconstruction of noisy seismic signals.

Keywords Seismic modeling · Local magnitude

References

[1] Acar T., Eke A., Kursun, S., Bivariate generalized Kantorovich-type exponential sampling series, Rev. Real Acad. Cienc. Exactas Fis. Nat. Ser. A-Mat., 118, 2024, Article number:35.

[2] Bardaro C., Bevignani G., Mantellini I., and Seracini M., Bivariate generelized exponential sampling series and applications to seismic waves, Constr. Math. Anal., 2(4): 153-167, 2019.

[3] Bardaro C., Broccatelli N., Mantellini I., and Seracini M., Semi-discrete operators in multivariate setting: Convergence properties and applications, Math. Methods Appl. Sci., 46(9): 11058-11079, 2023.

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