

Multiscaling manifold-valued data via approximation subdivision schemes

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The close connection between subdivision schemes and wavelets has been studied for decades. One milestone is Donoho's work from the nineties about the direct application of interpolatory subdivision operators as upscaling operators in a pyramid transform [1]. However, it has been established only recently how to use non-interpolatory operators similarly [2].

In this talk, I will briefly survey this hierarchical analysis and introduce the lifting of multiscale pyramid transform for analyzing manifold-valued functions. Then, we describe this construction in detail and present its analytical properties, including stability and coefficient decay. Finally, we numerically demonstrate the results and show the application of our method for denoising and abnormalities detection.

Joint work with: Wael Mattar.

References

- [1] David L Donoho. Interpolating wavelet transforms. *Preprint, Department of Statistics, Stanford University*, 2(3):1–54, 1992.
- [2] Nira Dyn and Xiaosheng Zhuang. Linear multiscale transforms based on even-reversible subdivision operators. In *Excursions in Harmonic Analysis, Volume 6*, pages 297–319. Springer, 2021.