Elements of Functional Data Analysis: Assessment

Please send your solution by email (a.duncan@imperial.ac.uk).
Deadline: 11th of April 2022

Choose **one** journal paper which you find interesting thats covers some aspect of functional data analysis, applied or methodological, and provide a short but comprehensive summary of the paper, including main results, summary of any proofs. If relevant, also perform some numerical experiments which reproduces some plots or results in the paper.

Some recommended papers to look at

1. Cuevas, Antonio, Manuel Febrero, and Ricardo Fraiman. "Robust estimation and classification for functional data via projection-based depth notions." Computational Statistics 22.3 (2007): 481-496.

2. Berrendero, José R., Beatriz Bueno-Larraz, and Antonio Cuevas. "On Mahalanobis Distance in Functional Settings." Journal of Machine Learning Research 21.9 (2020): 1-33.

3. Masarotto, Valentina, Victor M. Panaretos, and Yoav Zemel. "Procrustes metrics on covariance operators and optimal transportation of Gaussian processes." Sankhya A 81.1 (2019): 172-213.

4. Hall, Peter, and Ingrid Van Keilegom. "Two-sample tests in functional data analysis starting from discrete data." Statistica Sinica (2007): 1511-1531.

5. Victor M Panaretos, Shahin Tavakoli (2013). Cramér--Karhunen--Loève Representation and Harmonic Principal Component Analysis of Functional Time Series. Stochastic Processes and their Applications, (123)7.

6. Tavakoli, Shahin, and Victor M. Panaretos. "Detecting and localizing differences in functional time series dynamics: a case study in molecular biophysics." *Journal of the American Statistical Association* 111.515 (2016): 1020-1035.

7. Aue, Alexander, Holger Dette, and Gregory Rice. "Two-sample tests for relevant differences in the eigenfunctions of covariance operators." *arXiv preprint arXiv:1909.06098* (2019).

8. Hall, Rob, Alessandro Rinaldo, and Larry Wasserman. "Differential privacy for functions and functional data." The Journal of Machine Learning Research 14.1 (2013): 703-727.

9. Rao, Aniruddha Rajendra, and Matthew Reimherr. "Modern multiple imputation with functional data." Stat 10.1 (2021): e331.

10. Yao, Fang, Hans-Georg Müller, and Jane-Ling Wang. "Functional data analysis for sparse longitudinal data." Journal of the American statistical association 100.470 (2005): 577-590.

You may also choose any other paper you might be interested in; however, I would prefer if you emailed me with the title of the paper and your plans before going ahead

Note: the deadline is a month away, but I do not expect you to do more than what is reasonably achievable within a day.