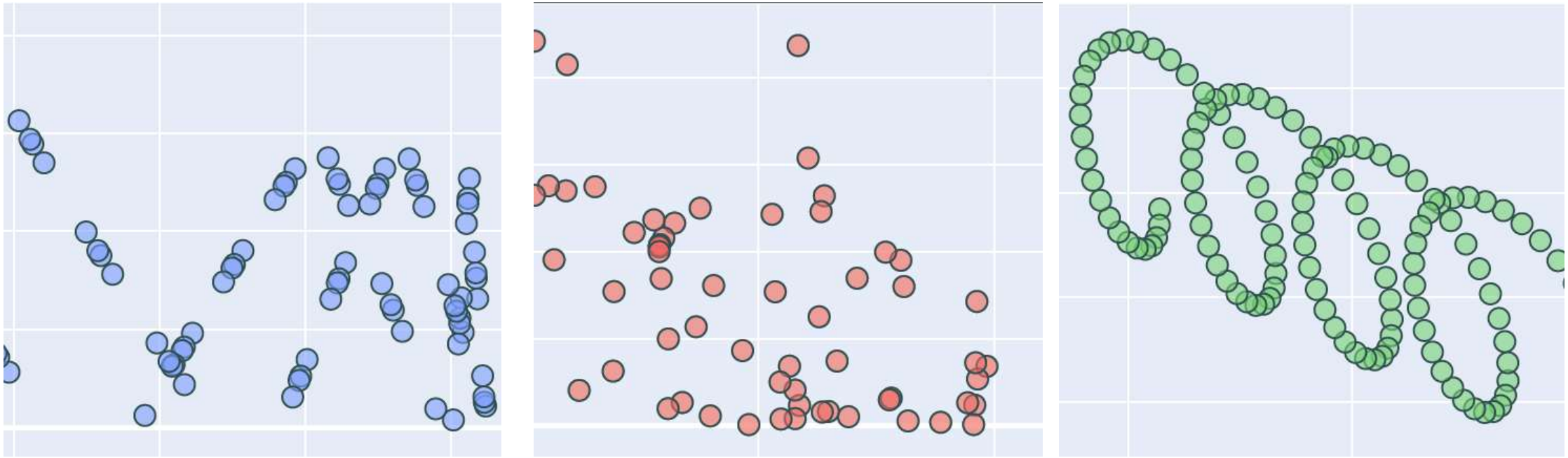


TDA SEMINAR TALKS

Pingyao Feng, NCSU

Jun 5, 2025

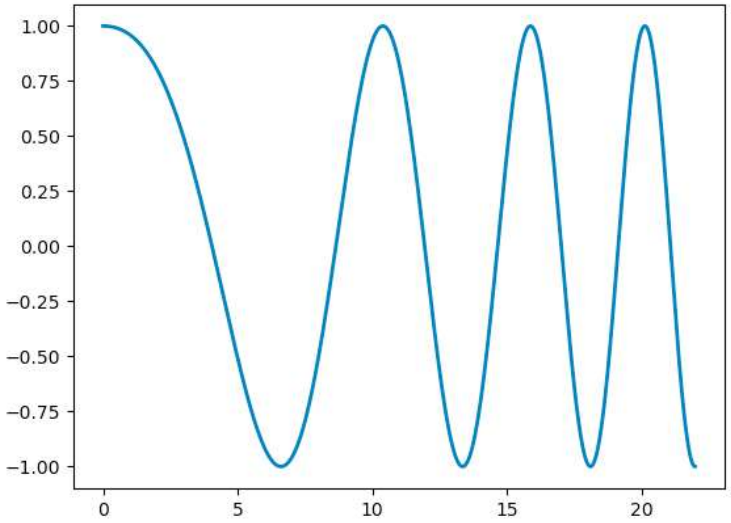
MOTIVATION

- Topological method is not easy to learn, and the results given by topological method are often disappointing.
- What kind of features can be distinguished by topological method? Is topological method really capable of my task to handle signal?
- Think about the Fourier series: when a function is integrable with period 2π, and satisfies locally-Lipschitz condition, then $f(x) = \frac{a_0}{2} + \sum_1^\infty (a_n \cos(nx) + b_n \sin(nx))$
- If we know how 'average line', 'frequency', and 'amplitude' is changing according to time, we might know all the information about a 'signal'. If topological method can tell those changes, it might be capable of handling signal.

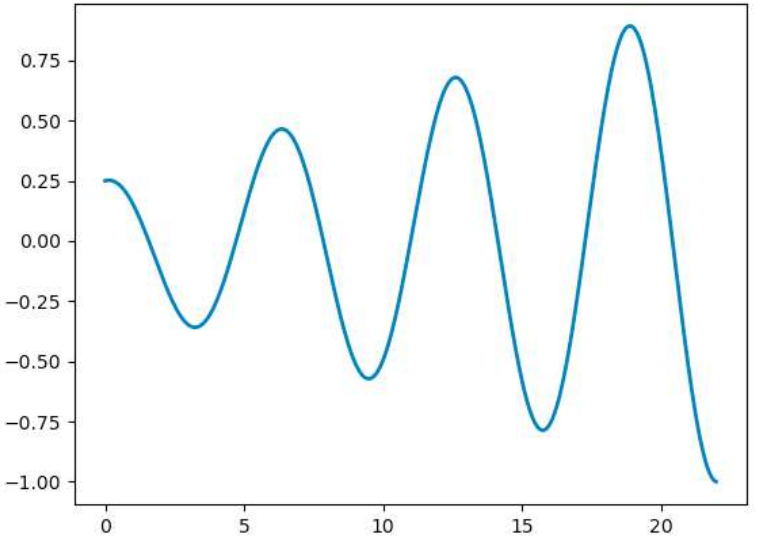
a

b

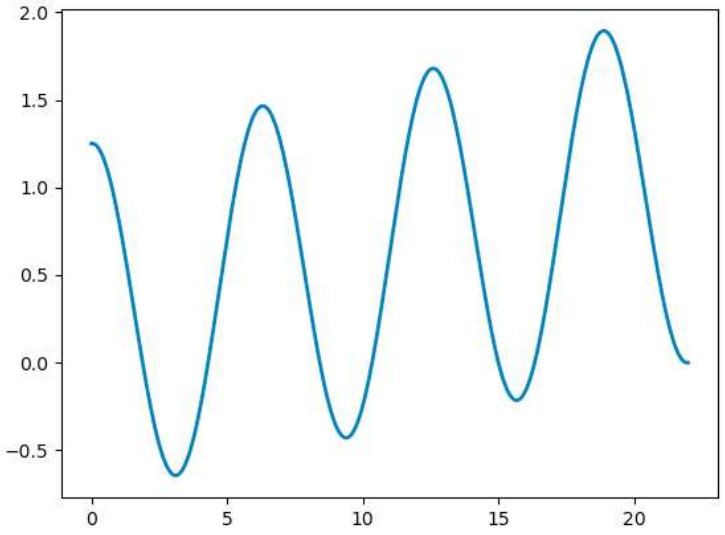
c



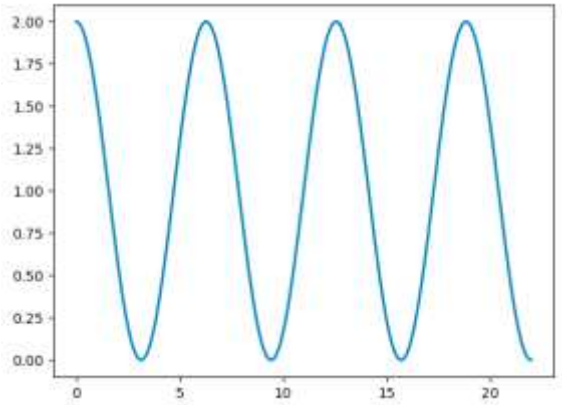
“frequency”



“amplitude”

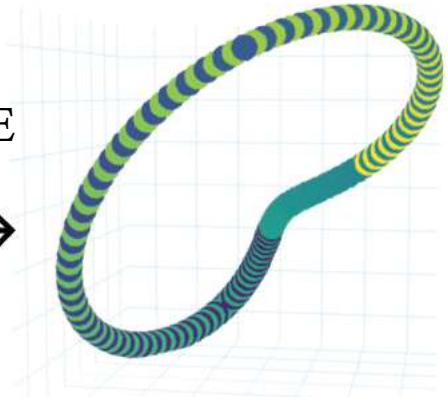


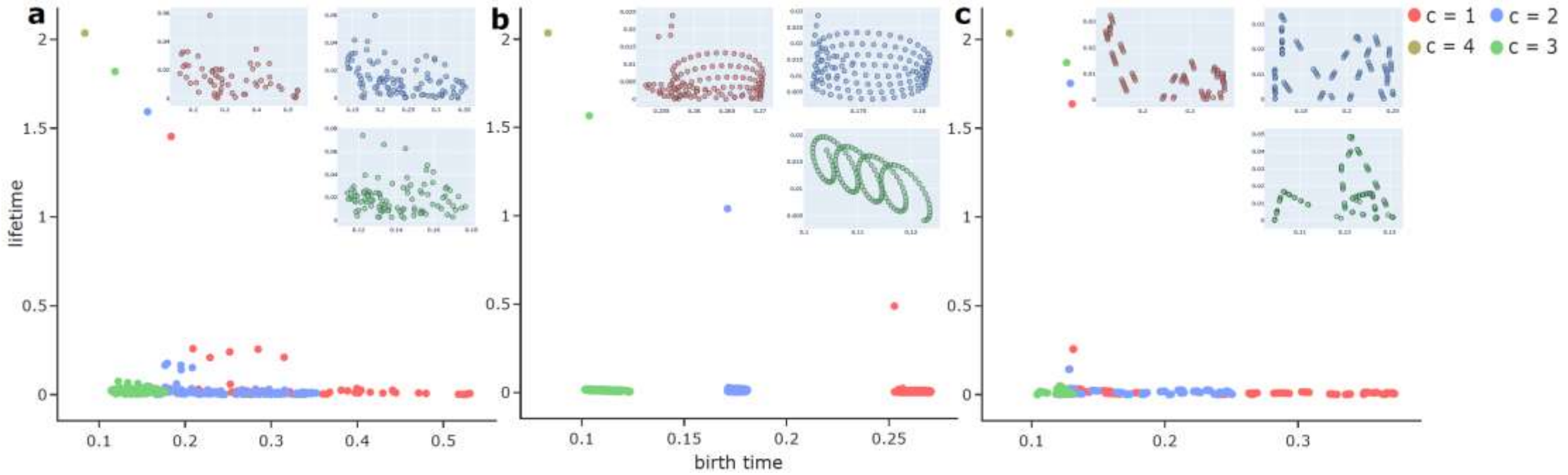
“average line”



Original signal

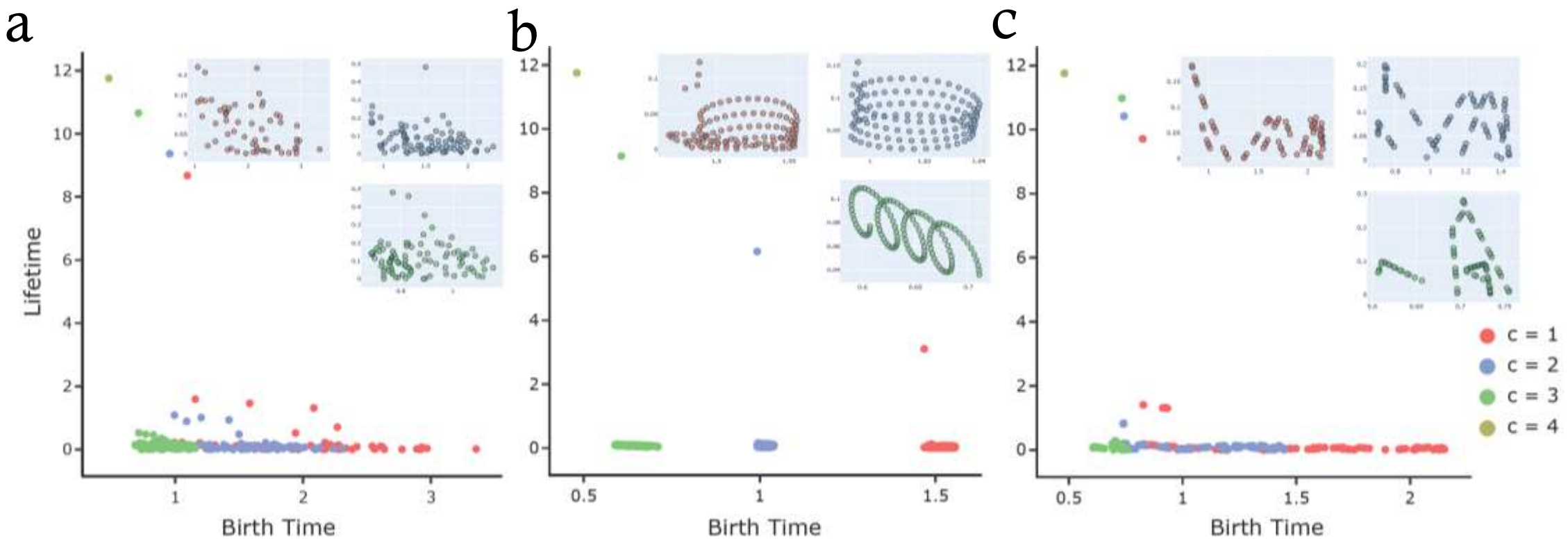
TDE





RESULTS

- Dimension: 3, delay: 100, skip: 10



RESULTS

- Dimension: 100, delay: 3, skip: 10

THANKS