EDM Readings and Resources– 2019 Sugihara

I. Two Main Summary Readings:

1) Causation: <http://www.sciencemag.org/content/338/6106/496.full?keytype=ref&siteid=sci&ijkey=GzlL9h2cAY51A>

2) Model-free:

<http://www.wired.com/2015/10/is-it-foolish-to-model-natures-complexity-with-equations/>

or PNAS Commentary:

<http://www.pnas.org/content/112/13/3856.short>

II. Essential Resource:

The rEDM package on CRAN is a key resource that contains a tutorial that many have found useful. It consists of code and vignettes with data that will help implementing EDM analysis on the data sets students want to analyze in class.

rEDM package: [https://cran.-project.org/web/packages/rEDM/index.html](https://cran.r-project.org/web/packages/rEDM/index.html)

III. Additional Readings that describe the two main EDM forecasting methods and a short note addressing time lags in CCM.

1) Simplex (1990):

<http://www.nature.com/nature/journal/v344/n6268/abs/344734a0.html>

2) S-maps original paper. (1994)

<http://rsta.royalsocietypublishing.org/content/348/1688/477>

3) S-maps. Deyle et al (2016) - contrary to classic model assumptions shows for the first time that ecological interactions are episodic!

<http://rspb.royalsocietypublishing.org/content/283/1822/20152258>

4) CCM with time lags. Ye, Gilarranz, Deyle et al (2015): <https://www.nature.com/articles/srep14750>

IV. Mathematical-Theoretical Background Readings

1. Embedology: Sauer, Yorke, Casdagli (1991). An excellent summary of state space reconstruction results

[https://link.springer.com/article/10.1007%2FBF01053745](https://link.springer.com/article/10.1007/BF01053745)

1. Deyle and Sugihara (2011):

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0018295>

 3) Ye and Sugihara Science 2016: Multiview Embedding (information leverage)

 <http://science.sciencemag.org/content/353/6302/922/tab-figures-data>

V. Supplementary Readings with Case Examples

1. Dixon et al Science (1999): larval supply spikes explained as a perfect storm of factors <http://science.sciencemag.org/content/283/5407/1528.full>
2. McGowan et al Ecology (2017): SIO Red tides: <http://onlinelibrary.wiley.com/doi/10.1002/ecy.1804/full>
3. Hsieh et al Nature (2006): Regime Shifts <https://www.nature.com/articles/nature03553>
4. Ye et al PNAS (2015): <http://www.pnas.org/content/112/13/E1569>
5. Glasser et al (2014): Fisheries prediction <http://onlinelibrary.wiley.com/doi/10.1111/faf.12037/full>
6. Deyle et. al. (2013): Climate effects on pacific sardines. Explains scenario exploration with EDM. <http://www.pnas.org/content/110/16/6430.full>
7. Deyle et. al. (2016): Global Environmental Drivers of Flu. An interesting use of scenario exploration to discover a temperature threshold (75F) below which absolute humidity inhibits flu transmission and above which it promotes flu transmission. <http://www.pnas.org/content/113/46/13081.full>

VI. Ancillary:

YouTube Playlist of 3 one-minute Animations (from the supplement of the Causality paper in Science 2012):

https://[www.youtube.com/watch?v=fevurdpiRYg&list=PL-SSmlAMhY3bnogGTe2tf7hpWpl508pZZ](http://www.youtube.com/watch?v=fevurdpiRYg&list=PL-SSmlAMhY3bnogGTe2tf7hpWpl508pZZ)