

University of Colorado  
Department of Computer Science  
Chaotic Dynamics – CSCI 4446/5446

Reading Assignments for Time-Series Analysis

*Slant font* means “required;” normal font means “optional.”

- Embedding, in general:

1. pp 1–3 (through section II A) of E. Bradley and H. Kantz, “Nonlinear time-series analysis revisited,” *Chaos* **25**:097501 (2015).

You can download that paper from [arxiv.org/abs/1503.07493](https://arxiv.org/abs/1503.07493)

2. pp10–13 of Liz’s time-series analysis notes (through section 3.1)
3. section 3.2 of Kantz & Schreiber.
4. sections 12.4–5 of Strogatz.
5. more detail: chapter 9 of Kantz & Schreiber

- Finding  $d_E$  and  $\tau$ :

1. section II B of the Bradley/Kantz paper listed above
2. sections 3.3–3.4 of Kantz & Schreiber
3. more detail: section 3.2 of Liz’s time-series analysis notes

- Lyapunov exponents:

1. chapter 5 of Kantz & Schreiber
2. Liz’s notes on Wolf’s algorithm.
3. section III 2 of Bradley/Kantz paper listed above
4. section 10.5 of Strogatz covers Lyapunov exponents of 1D maps
5. more detail: sections 3.3-4 of Parker & Chua (see the course webpage for a link to a pdf of this book).

- Fractal dimensions:

1. review sections 11.4 and 11.5 of Strogatz.
2. chapter 6 of Kantz & Schreiber (through 6.7 only)
3. section 7.1 of Parker and Chua has some good discussion of other kinds of dimensions besides capacity and correlation. There’s a scan of this section on the course webpage, as well as a link from which you can download the whole book.
4. F. Hunt and F. Sullivan, “Efficient Algorithms for Computing Fractal Dimensions,” in *Dimensions and Entropies in Chaotic Systems*, Springer-Verlag, Berlin, 1985, pp 74–81. A synopsis of this paper appears on pp 180–181 of Parker & Chua