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Nonlinear Dynamics: Mathematical and Computational Approaches
Lead instructor: ✉ Liz Bradley

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✓ 9.2 Computing Lyapunov exponents » Quiz   ← Prev   Next →

Question 1
The first step in calculating the Lyapunov exponent from a scalar time-series data set is ...

✔ ● A. to embed the data.

○ B. to perform a fast-fourier transform.

○ C. to look for each point's nearest neighbor.

Question 2
Wolf's algorithm for calculating Lyapunov exponents uses the variational equations.
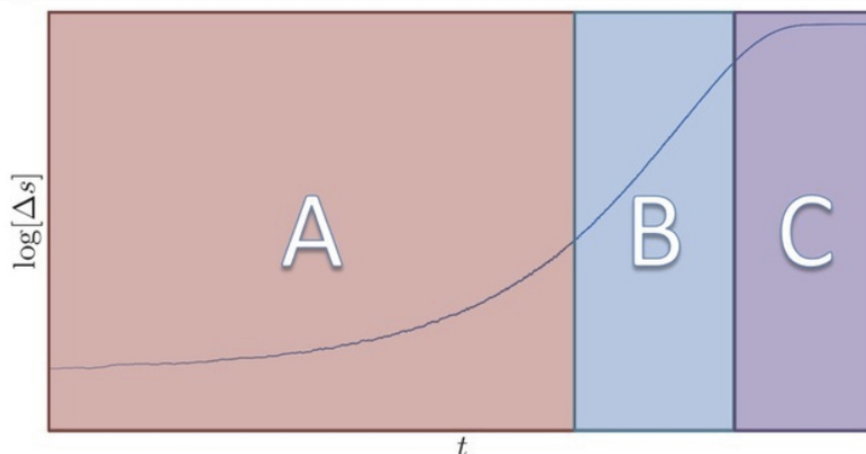
○ A. True

✔ ● B. False

Question 3
Why is it hard to calculate the Lyapunov exponent from data?

○ A. Because you don't get to drop points where you want them.

○ B. Because the data may be noisy.

○ C. Because the data may not be long enough to fully cover the attractor.

○ D. Because the sampling rate of the data may not be high enough to capture all of the dynamics on the attractor.

✔ ● E. All of A-D above.

○ F. None of A-D above.

○ G. Some but not all of A-D above.

Question 4
Consider the following plot of the stretching factor produced by Kantz's algorithm.

(a)

Does this curve have a visible scaling region?

✔ ⦿ A. Yes

○ B. No

(b)

The Lyapunov exponent of this trajectory is...

○ A. The y-intercept of a line fitted to the curve in region B.

✔ ⦿ B. The slope of a line fitted to the curve in region B.

○ C. The lowest value of $\Delta(s)$ where the curve flattens out (i.e., near the boundary between B and C).

○ D. The lowest value of $\Delta(s)$ where the curve becomes a line (i.e., near the boundary between A and B).

You got **5** out of **5** questions correct   Reset

Does this curve have a visible scaling region?

✔ ⦿ A. Yes

○ B. No

(b)

The Lyapunov exponent of this trajectory is...