Assignment 7: Monte carlo simulation of evolution

Name:

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Monte Carlo simulation

1. Run 1000 Monte carlo simulations of a one-dimensional trait for 100 steps for each of the following rates: 1, 10, 100.

   1.1. For each set, what is the mean trait value at step 100? What is the variance at step 100? What is the maximum difference (range) at step 100? [note that the output of RandomWalk has 101 values, the first of which is step 0].

   1.2. How would you simulate a random walk that starts at value 100 instead of 0.

2. Use a dataset of your choice to create a morphospace.

   2.1. How many total dimensions are in your morphospace? How many dimensions have variance associated with them?

   2.2. For the dimensions that have variance, what rates are appropriate for simulating evolution of your taxa in 100 steps?

   2.3. Simulate 100 bi-variate random walks in your space and graph them with your original objects to demonstrate that your rate choice is appropriate.

   2.4. Simulate one randomly evolving shape for 100 steps and show the output as an animated graphic of landmarks (with splines for 2D data, without for 3D data).