

FRONT:

The main goals of this lab are:

1. To understand the stochastic exponential growth model, and how to make projections from it.
2. To be able to code this in MathCAD.

There is one important logical error in the code that Sinclair, Fryxell & Caughley provide in the file PVA_Chapter17.mcd.

I think that you might be able to ferret it out on your own, and that this would be a good 'extra-credit' sort of activity, if you are feeling comfortable with MathCAD and with the model under discussion.

If looking for the error is going to be a distraction from working through the main goals, flip this over.

BACK:

In step 9, SFC make an important error that causes overestimation of population growth. They project future population sizes using the equation

$$N_{t+1} := N_t \cdot e^{\mu + \varepsilon_t}$$

This model assumes that the random values of ε ('random normal deviates') are centered on zero. But in step 6, they have already drawn values of ε that are centered on the growth rate μ .

$$\varepsilon := \text{rnorm}(101, \mu, \sigma)$$

Therefore, the correct growth model in step 9 is

$$N_{t+1} = N_t e^{\varepsilon_t}$$

Using the model as written in the key at for step nine would be double-accounting for the difference in mean growth rate (\hat{r}) and zero.