Make a world

Slides for break-out group

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February 2-3 2021

Section 1

Outline

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- agree on a git workflow
- apples: we will working from the R Markdown Notebook called "orchard.Rmd"
- fishes: we will working from the R Markdown Notebook called "age-and-growth.Rmd"

Section 2

git workflow

git workflow

- clone vs. fork the sim-make-a-world repository
- pull (git pull origin main)
- create your own branch (git checkout -b yourbranchname)
- go nuts with your ideas and code contributions
- add, commit,
- eventually, push
- open a merge request / pull request
- pull

Section 3

Apples

Apples

An orchard with 100 x 100 trees

2 types of orchards: 1 - uniform distribution of apple trees across the orchard (uniform orchard) 2 - an orchard with a “good” zone with productive trees and a “bad” zone with less productive trees (two-tier orchard)

2 sampling strategies with similar time investments: a - sample 10 trees with a ladder (count all the apples in each tree) b - sample 20 trees from the ground (only count the apples that you can reach)

Measure of performance: - minimize the probability of overestimating the number of apples in the orchard

Deterministic case - uniform orchard

100 apples in each tree x 10,000 trees = 1,000,000 apples

How many trees do you need to sample to estimate this value?

What is the probability of overestimating the number of apples in the orchard?

Deterministic case - two-tier orchard

100 apples in each tree x 5,000 trees = 500,000 apples 50 apples in each tree x 5,000 trees = 250,000 apples for a total of 750,000 apples

How many trees do you need to sample to estimate this value?

What is the probability of overestimating the number of apples in the orchard?

Stochastic case

Each tree has its own number of apples

Do we really need simulations for this?

Possible expansions (the slippery slope)

Section 4

Fishes

Fishes

A fish population where growth is to be estimated

2 types of growth 1 - growth is the same for all individuals in the population 2 - individuals in the population exhibit different growth based on the year they were born (cohort effect)

2 sampling strategies a - use length-age pairs to estimate a growth model b - use individual growth trajectories to estimate a growth model

Measure of performance: - minimize the probability of overestimating length-at-age

Deterministic case

Stochastic case

Possible expansions (the slippery slope)

Section 5

Useful nuggets

Useful nuggets

- the importance of seeding the random number generator
- writing output as your simulations run, R Notebooks are pretty useful for exploratory analyses
- loops vs. vectorized functions
- how long will this simulation take to run?
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Section 6

staying the course

staying the course

1 - operating model realisations 2 - analytic treatments 3 - performance measures

Section 7

getting lost in the possibilities

Section 8