process-models-workshop

The RoLE Team

5/2/2023

Table of contents

1 Introduction

This is a quarto book project for creating materials for the second half of the MDBD workshop.

There is a list of planned sections in the "List of sections" chapter.

To add a new section, start from the "Template section". Open `template_section.qmd`, save-as, and populate it; then add it to the list of sections in `_quarto.yml`.

To update the Pages site, run `quarto render` from a local terminal. This will render the files to the `docs` directory. Then push, and GitHub pages will serve the site from `docs`.

2 Planned sections

3 Day 1

1. Theory/conceptual motivation for process models
2. Introduction to RoLE
3. Getting started running simulations with RoLE
4. Using RoLE to develop and test theoretical intuition

4 Day 2

1. Process models for inference
2. Inference on empirical data
3. Reproducibility (sharing and archiving)
4. Wrap-up

5 Lesson template

5.1 Section title:

5.2 Key questions

List 1-3 key questions to motivate this section of the workshop.

5.3 Lesson objectives

List 1-3 lesson objectives, filling in the prompt "After this section of the workshop, participants should be able to…."

5.4 Planned exercises

List planned activities for this section of the workshop. Examples could include (but not limited to) lectures, live-coding demos, breakout sessions, group discussions, etc.

5.5 Supporting materials

Describe, and where possible link to, lesson materials that will be needed for this section of the workshop. These could include code for live coding, code documentation, book chapters, videos/animations, etc.

For bonus points organize these according to whether they already exist or we need to create them!

5.5.1 Extant

5.5.2 To create

5.6 Key points

List 1-3 key takeaways from this section of the workshop.

6 Theory and motivation of process modeling

6.1 Key questions

1. What is a process modeling approach?
2. What kinds of questions can process models explore (that other methods cannot)?
3. What are the limitations or constraints of process modeling?

6.2 Lesson objectives

After this lesson, learners should be able to...

1. Describe what defines a process model.
2. Evaluate the pros and cons of a process modeling approach.
3. Generate questions in ecology and evolution that could be addressed using process modeling.

6.3 Planned exercises

List planned activities for this section of the workshop. Examples could include (but not limited to) lectures, live-coding demos, breakout sessions, group discussions, etc.

6.4 Supporting materials

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6.4.1 Extant

6.4.2 To create

6.5 Key points

List 1-3 key takeaways from this section of the workshop.

7 Introduction to the RoLE Model

7.1 Key questions

1. What is the RoLE Model?
2. What are some of the possible applications of the RoLE Model?
3. How do I learn more?

7.2 Lesson objectives

After this lesson, learners should be able to...

1. Situate RoLE in the wider process modeling state space.
2. Describe the (high-level) concept for RoLE.
3. Formulate scientific questions and decide if/how RoLE can be used to explore them.

7.3 Planned exercises

- Lecture/visuals
- Discussion/breakout groups

7.4 Supporting materials

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7.4.1 Extant

7.4.2 To create

7.5 Key points

List 1-3 key takeaways from this section of the workshop.

8 How a RoLE model works

8.1 Key questions

1. What are the inputs and outputs of a RoLE model?
2. What happens when a RoLE model runs?

8.2 Lesson objectives

After this lesson, learners should be able to...

1. Describe the structure of a RoLE model.
2. Describe the rules of a RoLE simulation.
3. Describe the outputs of a RoLE model and what they say about the system.
4. Describe some of the "special cases"/RoLE "flavors" (neutral, LV, etc)

8.3 Planned exercises

- Whiteboard demo/lecture

8.4 Supporting materials

Describe, and where possible link to, lesson materials that will be needed for this section of the workshop. These could include code for live coding, code documentation, book chapters, videos/animations, etc.

For bonus points organize these according to whether they already exist or we need to create them!

8.4.1 Extant

8.4.2 To create

- Relevant chapters of user guide.

8.5 Key points

List 1-3 key takeaways from this section of the workshop.

9 Getting started: roleR

9.1 Key questions

1. How do I set up and run a RoLE model in R?
2. How do I access and visualize the results of a RoLE simulation?
3. How can I store the outputs of a RoLE model?

9.2 Lesson objectives

After this lesson, learners should be able to...

1. Use roleR to run a basic RoLE model.
2. Extract summary statistics from a RolE model, plot them, and relate the visuals to ecological/evolutionary processes.
3. Save RoLE models to disc.

9.3 Planned exercises

- Code-along demo
- Experimentation time (set a challenge and report back?)

9.4 Supporting materials

Describe, and where possible link to, lesson materials that will be needed for this section of the workshop. These could include code for live coding, code documentation, book chapters, videos/animations, etc.

For bonus points organize these according to whether they already exist or we need to create them!

9.4.1 Extant

9.4.2 To create

- Relevant chapters of user guide.

9.5 Key points

List 1-3 key takeaways from this section of the workshop.

10 Using RoLE to explore hypotheses

10.1 Key questions

1. How do I use RoLE to explore/generate theoretical predictions

10.2 Lesson objectives

After this lesson, learners should be able to...

1. Formulate hypotheses for how tweaking parameters will affect model outputs
2. Use RoLE to test these hypotheses in silico
3. Synthesize the outcomes

10.3 Planned exercises

- Group brainstorming of params to tweak
- Breakout to test them
- Come together to debrief/synthesize

10.4 Supporting materials

Describe, and where possible link to, lesson materials that will be needed for this section of the workshop. These could include code for live coding, code documentation, book chapters, videos/animations, etc.

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10.4.1 Extant

10.4.2 To create

- Relevant chapters of user guide.

10.5 Key points

List 1-3 key takeaways from this section of the workshop.