

Template to prepare preprints and manuscripts using markdown and github actions

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Purpose: This template provides a series of scripts to render a markdown document into an interactive website and a series of PDFs.

Motivation: It makes collaborating on text with GitHub easier, and means that we never need to think about the output.

Internals: GitHub actions and a series of python scripts. The markdown is handled with pandoc.

1 Forecasting in ecology. Forecasting in weather, introduce computers.
2 Future is uncertain, how do we best act given a forecast?
3 We have some goal state for the future, and some estimate of what the state of the world will be given a set
4 of actions.
5 Brief summary of decision theory.
6 Transition to theme of optimization given unknown information. In face of uncertainty, decision making
7 is an optimization problem. Frame optimization problem mathematically an introduce concept of
8 solution-space and constraint.
9 Transition to how this is applied in ecology. Introduce idea of monitoring network. Transition to specifics
10 of this thesis.

11 [Figure 1 about here.]

12 **CH1 optimizing sampling of species distributions**

- 13 • simulate species distribution and efficacy of detection given a set of observation points where the
14 dist from observation site decays.
- 15 • optimize set of repeated sampling locations L for a *known* distribution D .
- 16 • address SDM not being the territory

17 **CH2 optimizing sampling of interactions**

- 18 • the missing link paper, turn this into optimizing with two different SDMs

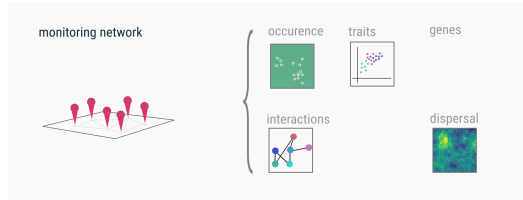
19 **CH3 optimizing corridor placement**

- 20 • land cover -> resistance -> extinction time
- 21 • simulated annealing to optimize landscape optimization

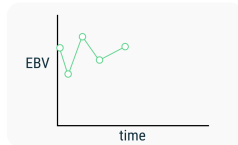
22 **CH4 a software note on the resulting packages.**

23 • `Observatories.jl`, `Corridors.jl`, `MCD.jl`

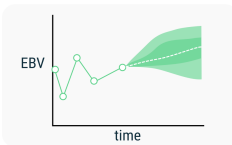
data



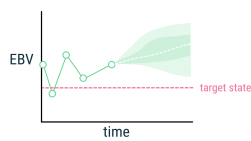
Essential Biodiversity Variable



Forecast



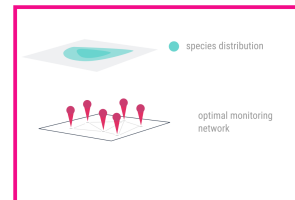
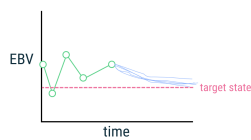
optimizing action to get target state



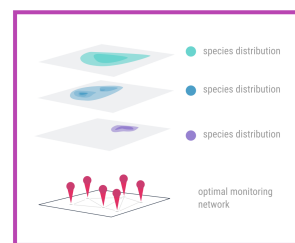
all actions -> constraints -> possible actions

optimal action

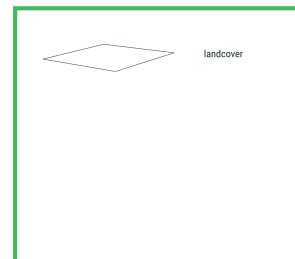
goal to minimize distance actual outcome (unknowable until the future)



chapter one
optimizing sampling
of species distributions



chapter two
optimizing sampling
of interactions



chapter three
optimizing corridor
placement against
ecological dynamics



chapter four
MetacommunityDynamics.jl:
a virtual laboratory for
community ecology

Figure 1: thesis concept