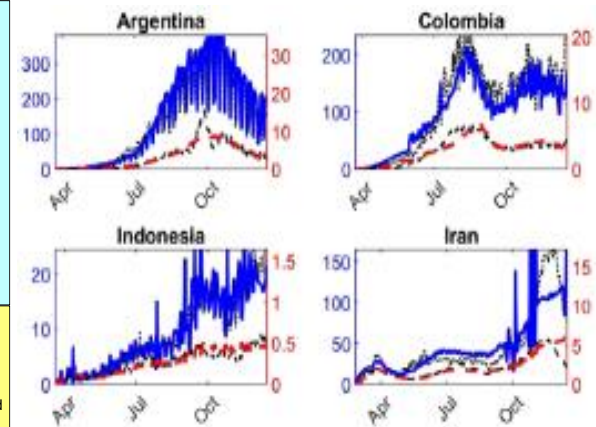
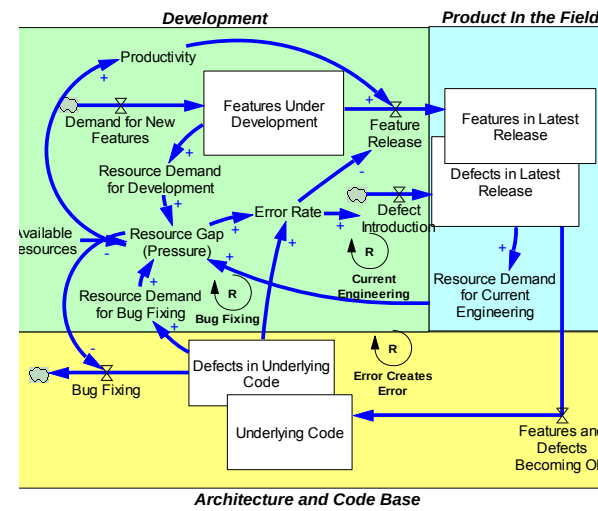
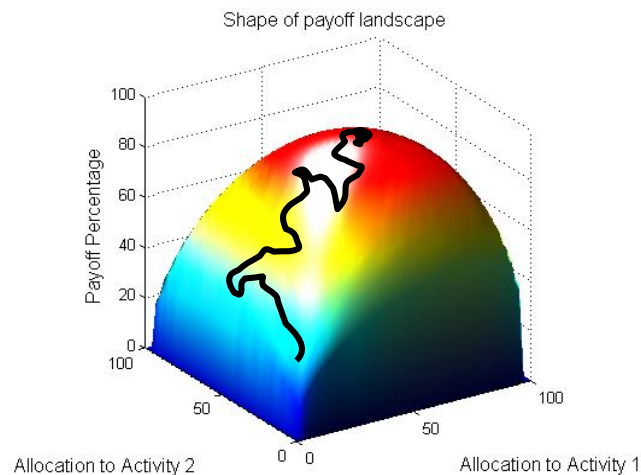
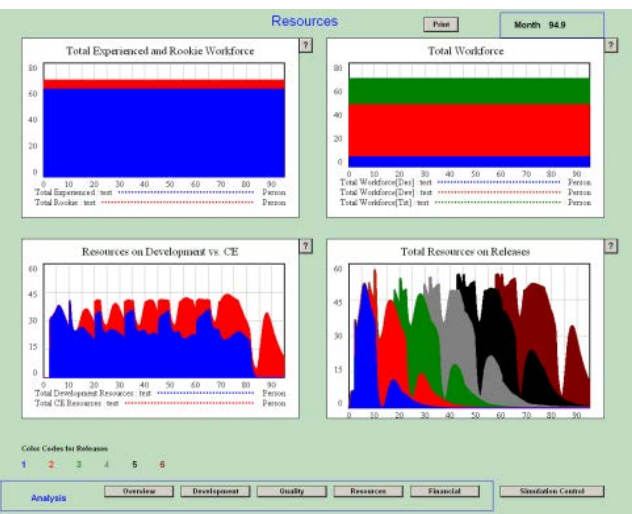


System Dynamics Research Seminar

Week 4: Predator Prey

15.879, Spring 2025



Model S4: Predator Prey

- A predator prey model with carrying capacity for prey (e.g. vegetation in a wolf and deer model):
 - Robust formulations for flows of each species
 - Level Protected by Flow molecule
 - Key resulting behavior modes
 - Extreme conditions tests
 - Understanding basic behavior mode

Model S4- Common Challenges

- Actual predation rate so that:
 - Responsive to deer density (max? min?)
 - Wolf be able to live on it (starving dynamics)
 - Unit changes
- Interference from the memory of classical models
- Extreme conditions robustness (wolves don't grow on their own etc)

Next week: Drug Pipeline Management

- Build a model for managing drug pipeline in pharma, accounting for 3 clinical trial stages (and their failure rates) and drugs in the market. Focusing on starting candidates into phase 1 to hit desired revenue targets that are constant or growing with a fixed percentage over time.
 - What formulations are you reminded of? What are the challenges you see?
 - What are good tests of performance and robustness for the resulting model?
 - What are key inputs to change and outputs to track for those tests?

What are good tests of performance and robustness for the resulting model?

- Inputs:
- Outputs:
- Expected behaviors:
- Robustness tests:

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