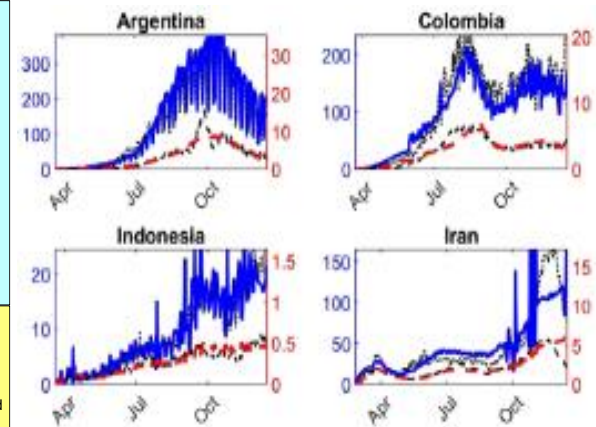
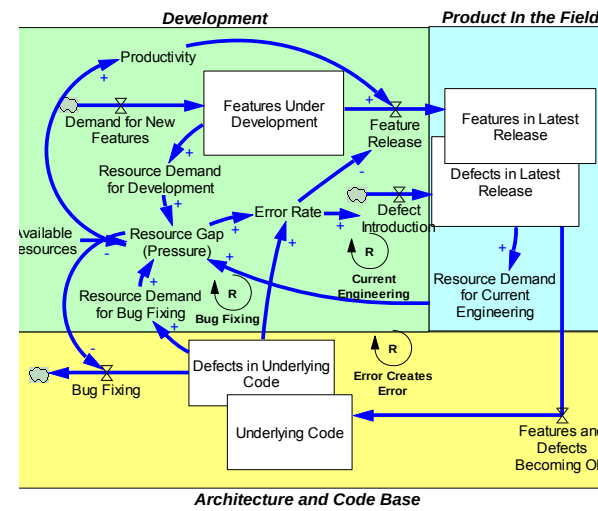
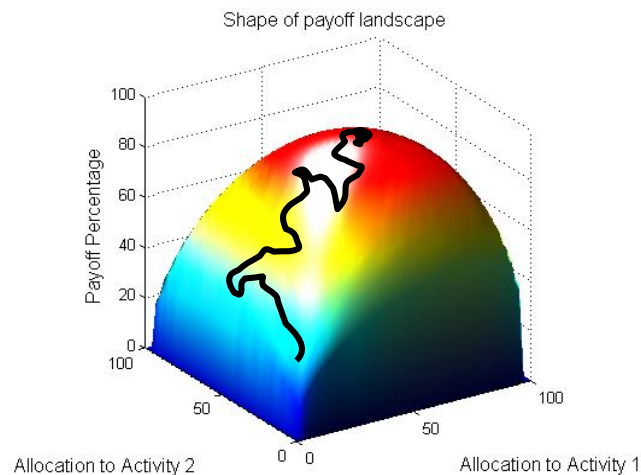
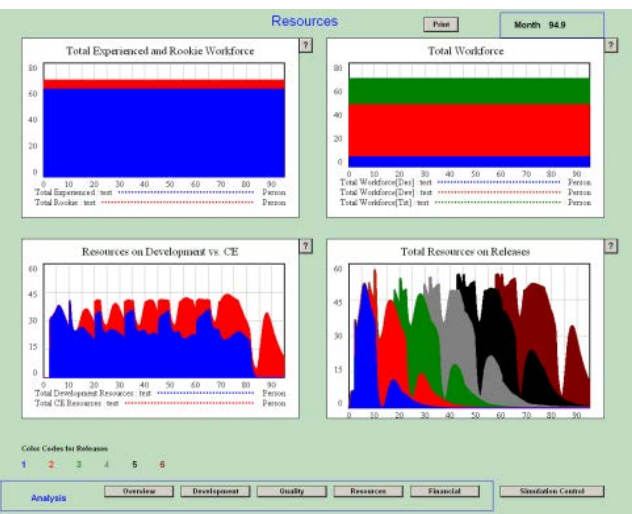


System Dynamics Research Seminar

Week 3: Energy Efficiency Coflows

15.879, Spring 2025



SEIRb Recap

- Waning of immunity, natural vs. vaccine based
- Accounting for deaths in calculating fraction willing to vaccinate
- Equilibrium conditions

Model S3: Energy Coflows

- Coflows tracking energy efficiency of buildings as they change due to 1) Vintage effects 2) Retrofits 3) New efficiency technologies.
- Looking for robust and reasonable behaviors in total (and per sqf) energy consumption in response to different inputs on retrofit investments, efficiency technology introduction, and building rates.

Next week: Predator Prey with Carrying Capacity

- In exercise 4 you build a predator prey model with carrying capacity for prey (e.g. vegetation in a wolf and deer model):
 - What is a good problem definition?
 - What stocks would you need to include?
 - 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?

- Can we recreate the expected reference modes (e.g. oscillations)?
- Inputs:
 - Parameters (e.g. reproduction rates)
 - Initial states for all
 - Hunting of both species
 - Changing land availability
- Outputs:
 - Populations of all species and carrying capacity
- Take out some population and see what happens with the other two
- Making carrying capacity infinite
- Go through iterations (deer, then add wolf, then add carrying capacity)
- Analyze one key behavior out of the model and fully understand it

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15.879 Building Serious System Dynamics Models from Scratch
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