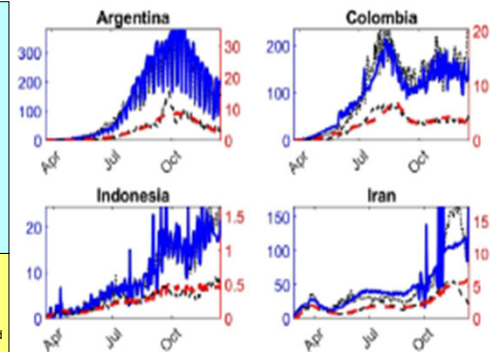
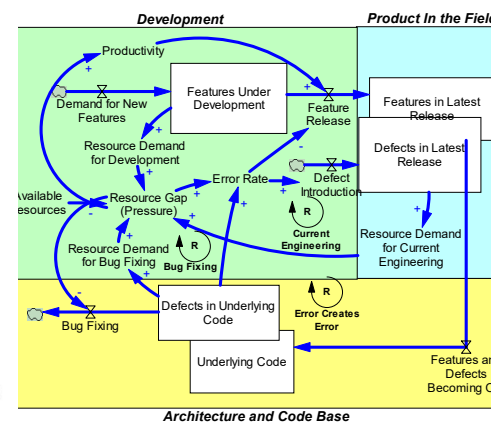
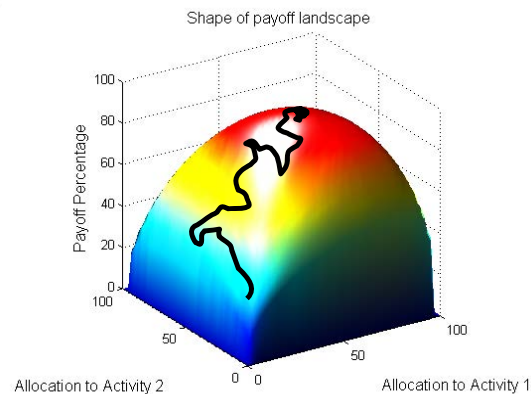
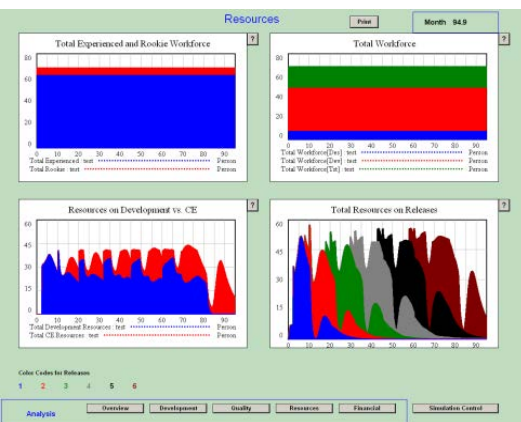


System Dynamics Research Seminar

Week 5: Drug Pipeline

15.879, Spring 2025



Predator Prey Follow Up

- Classical model likely to create oscillations
- Adding more realistic saturation mechanisms weakens or removes oscillations
 - Typical modes are overshoot followed by extinction or co-existence in equilibrium
 - Why real predator prey systems sometimes show persistent oscillations?
- With nonlinear saturation, harder to put model into equilibrium analytically
- Many models use the outflow from prey to drive inflow into predator (biomass conversation idea)

Model S5- Common Challenges

- Equilibrium with failure rates
 - Adjustment for stocks
- Start rate for drugs as a function of what you want to achieve

Model S5- What I look for

- Basics
 - Units
 - Non-negativity of physical stocks
- Stock adjustment
 - Accounting for growth patterns and failures
- Replacement
 - Accounting for growth and failures
- Equilibrium
 - Within an exponential growth framework

S05: Drug Pipeline Management

- 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.
 - Formulations accounting for future trends and pipeline adjustment
 - Tests of performance and robustness

Next Session: Ponzi Model

- Build a simple model of Ponzi story
- Start grounded in the case, but try to make the formulations generic so they could be parameterized for other setups (e.g. Social Security)
- Characteristics of a good model?

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