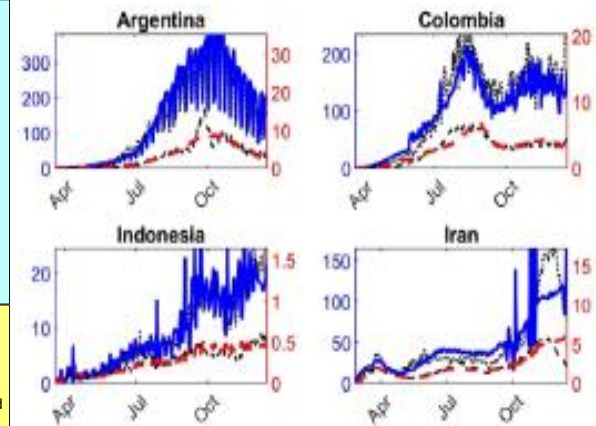
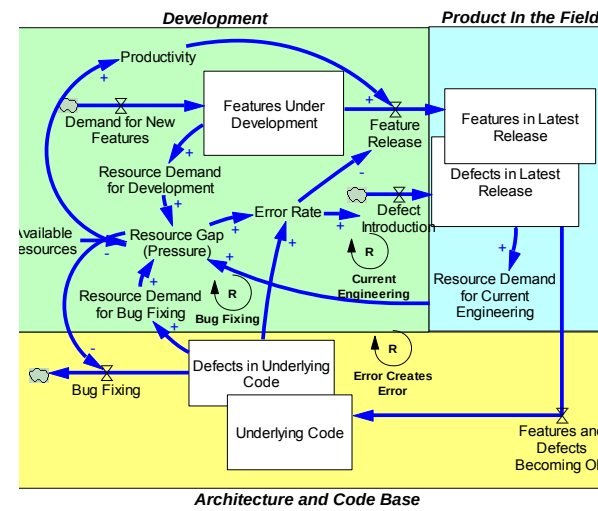
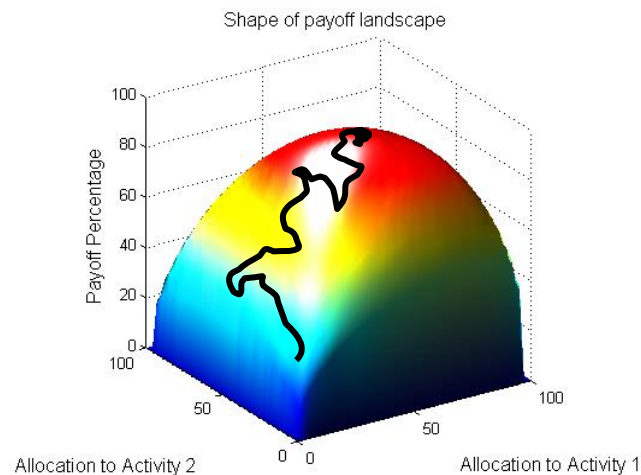
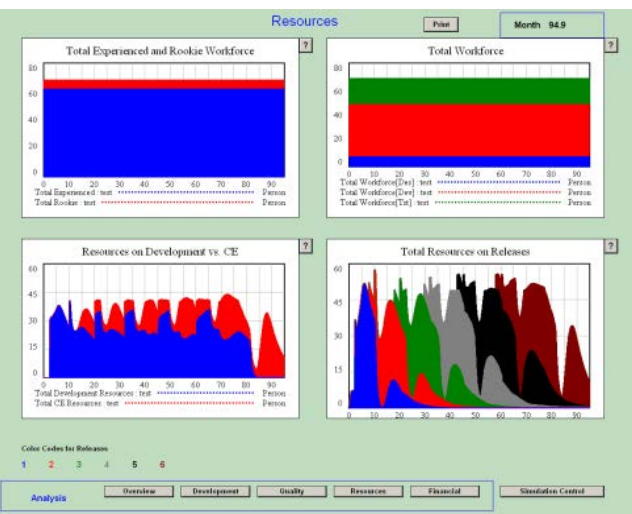


System Dynamics Research Seminar

Week 7: Market Growth

15.879, Spring 2025



Problem Proposals

- Review the feedback and provide an updated proposal before 4/11
- I will send a review roster for going through 3 (first draft) problems, critiquing those, and bringing up discussion points on 4/18

S07: Market Growth

- Model of a firm in a monopolistic setting:
 - Durable product with a total market size, from inception to maturity
 - Product sold through direct sales force. The firm allocates a fraction of its total revenue to its salesforce. Their productivity limited by availability of interested customers and delivery delay reputation.
 - Manufacturing operation with a backlog, rather than holding inventory
 - Excessive delivery delay is the primary signal to the firm for expanding their production capacity

Model S7- Common Challenges

- Hard to isolate specific pieces, so required an integrated model

Model S7- What I look for

- Limited market with repeat purchase captured in a robust way
- Robust formulation for sales (limited both by availability of customers and delivery delay)
- Capacity expansion without risk of going negative, and dynamic utilization of capacity
- **Bonus:** Calculating marginal utility of salesforce to inform desired salesforce

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

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

Next Week: Endogenous Diffusion

- Diffusion of a product that is evolving over time:
 - Fraction of population adopting evolves with potential use cases (scope of the product) and its perceived utility
 - Faster adoption when more adopters help spread info
 - Scope expanded, with potential bugs gradually identified and fixed
 - Perceived utility getting feedback from perceived and actual bugs

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