

# Adaptive Semi-Strong Ecosystem Dynamics

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# Main Topic: Desertification



How do we get from vegetated land to bare soil?

# Mathematical Model

Extended Klausmeier model

$$U_t = \Delta U + \nabla (U \nabla H) + a - U - UV^2$$

$$V_t = \varepsilon^2 \Delta V - mV + UV^2$$

Variables:

$U$  Water

$V$  Vegetation

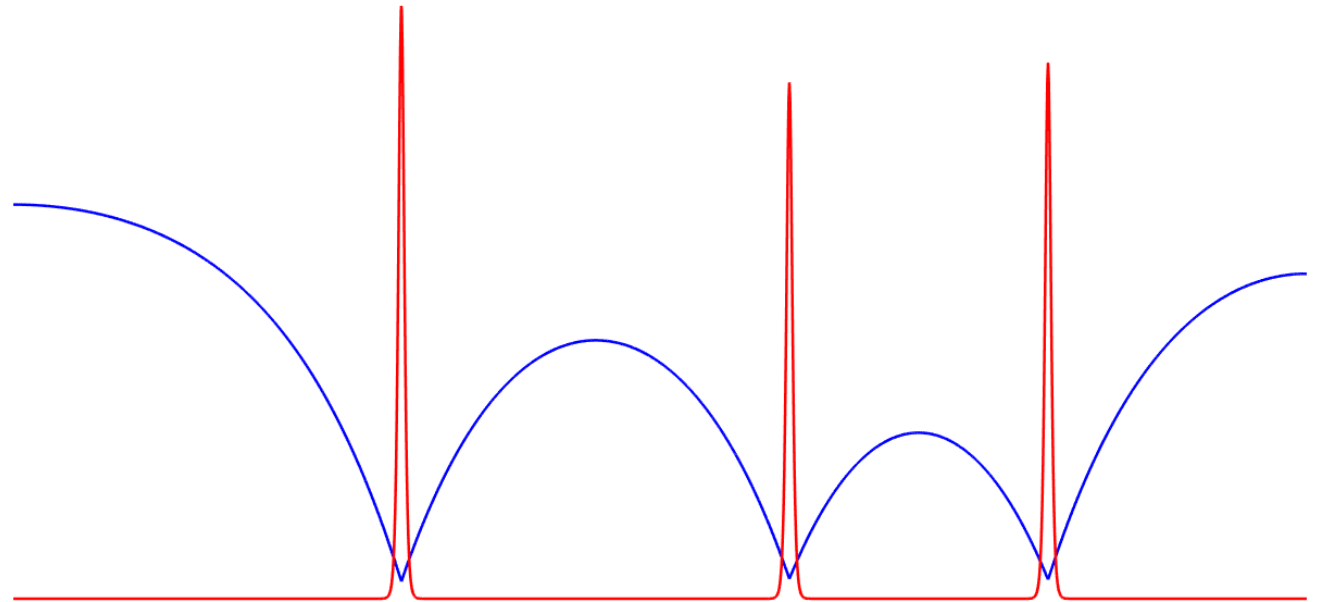
Parameters:

$a$  Rainfall

$m$  Mortality of plants

$\varepsilon$  Small parameter

$H$  Height of terrain

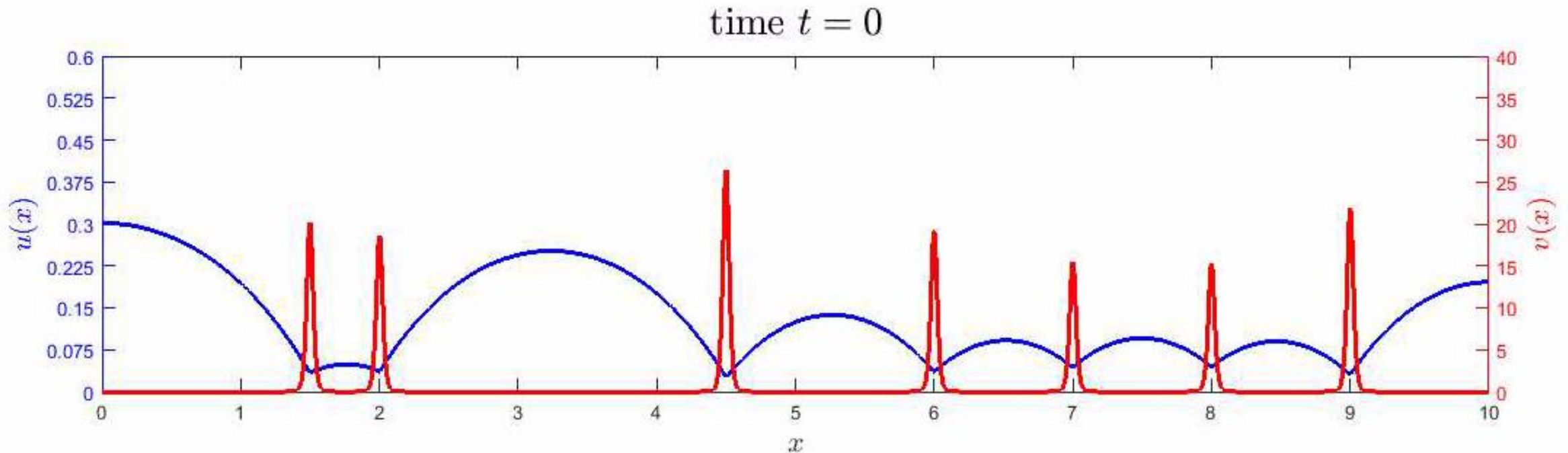


# What I do

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Study the dynamics of vegetation pulses

- Interaction between pulses
- Effects of a changing climate
- Effects of different topographies

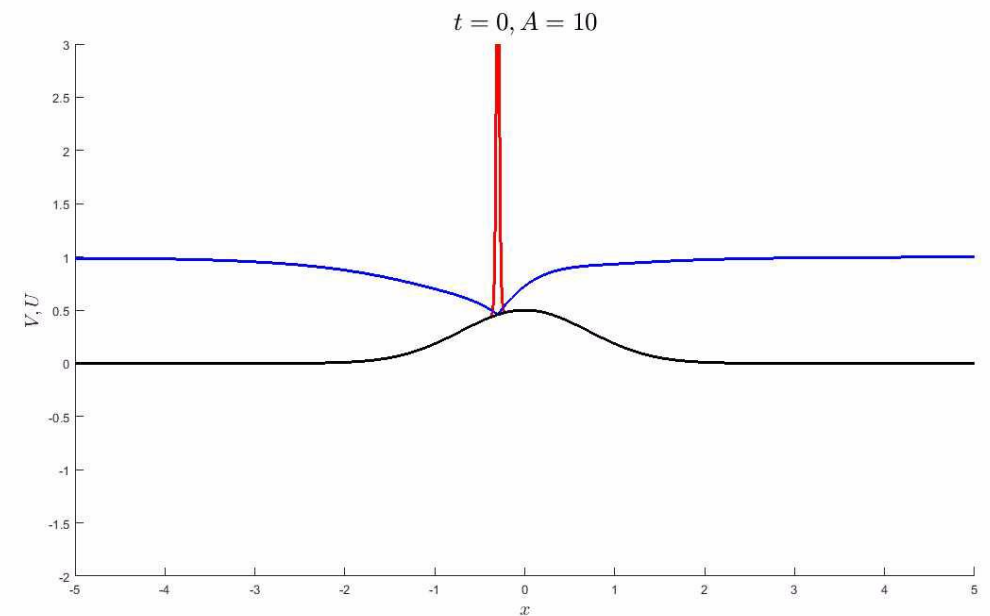
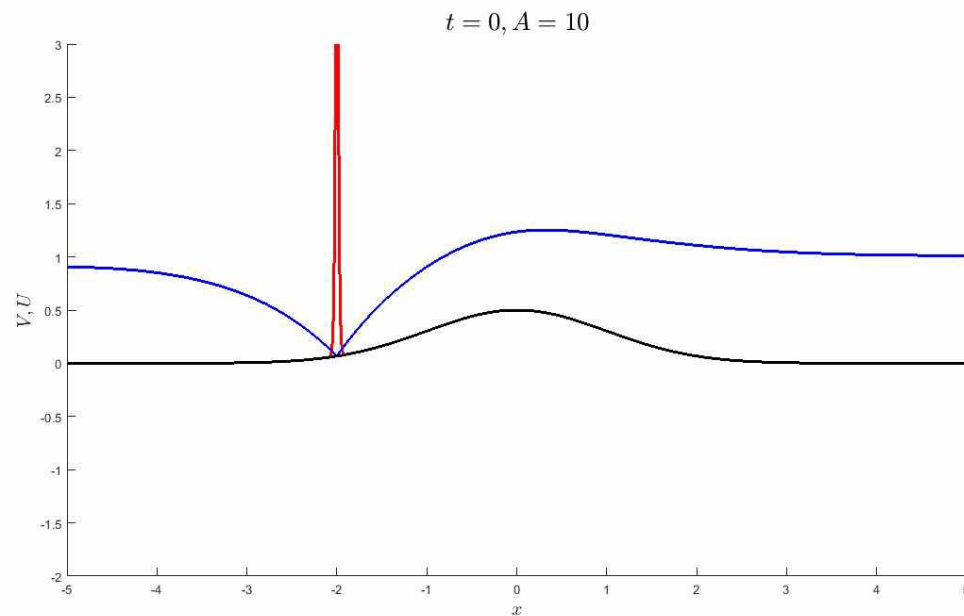


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# Also ecology

Currently:

Test model predictions!

New kind of problems:

- What are the predictions?
- How to test them?
- Communicate mathematics



# Summary

Work on applied math problem

- Leads to new ecological insights

AND

- New mathematical insights



Goal: to have a better understanding of desertification process