Adaptive Semi-Strong Ecosystem Dynamics

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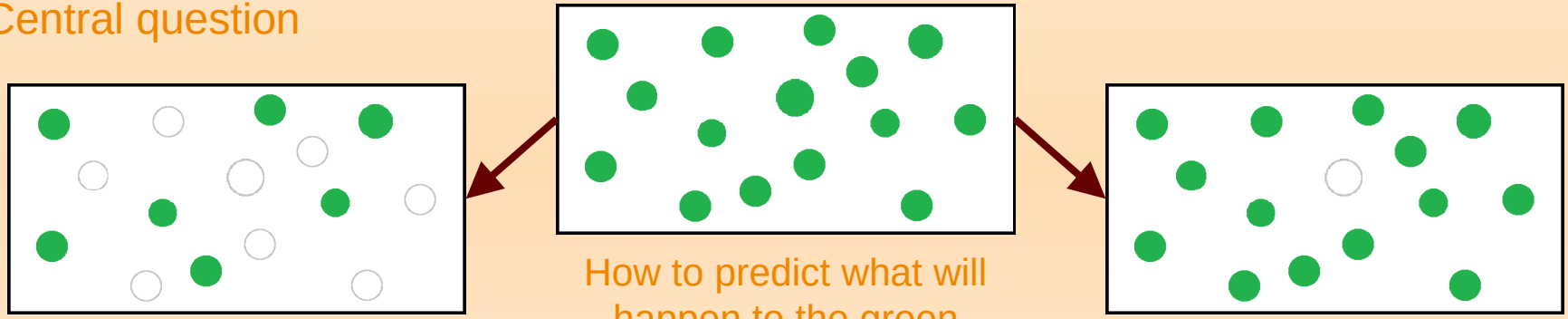
Central topic desertification

Central question



How to predict what will happen to the green vegetation patches?

period doubling
'mini-catastrophe'

gradual shift

Mathematical outline

- Reduction of PDE with a varying coefficient to an N-dimensional ODE.
- Study linear stability of a N-pulse solution, via Evans functions.
- Vary the rainfall parameter.

$$\frac{\partial u}{\partial t} = \Delta u + \nabla \cdot (u \nabla \zeta) + F(u, v; \mu, \varepsilon)$$
$$\frac{\partial v}{\partial t} = \varepsilon^2 \Delta v + G(u, v; \mu, \varepsilon)$$