Modeling Zombies and Infection

Ricky Marske and Steven Rosendahl

A Simple Model

Population Decay

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- r : Decay rate
- x : The amount of time that has passed

Adding Complexity

Probability

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    1. No one was immune
    2. Non-Infected would have no response to infected
    3. No one could survive the virus or be cured

Immunities

Non-Infected Responses

Cures and Survival

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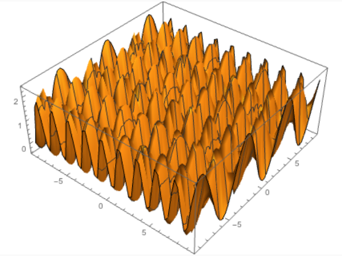
$$u_{tt} - k^2 u_{xx} = \zeta$$

- ζ represents the time offset
- This yields the solution

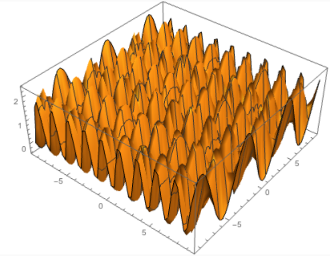
$$u(x,t) = \zeta + \sum_{n=1}^{\infty} (k_1 \sin t + k_2 \cos t) \sin n\pi x$$

Cures and Survival



$n = 1$

Cures and Survival



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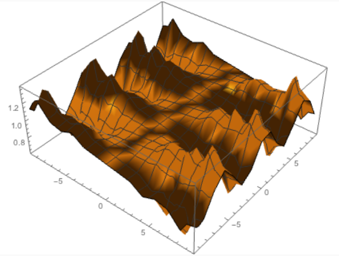
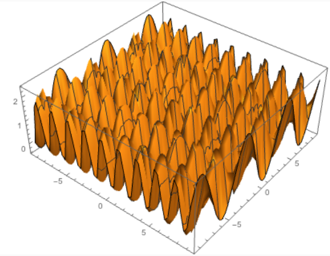


$n = 100$

Cures and Survival



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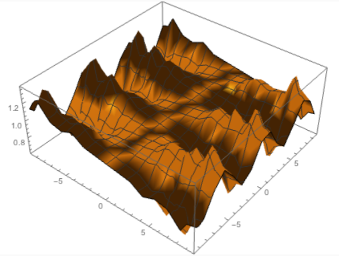

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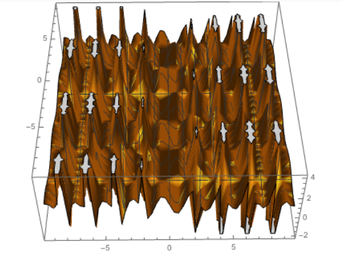
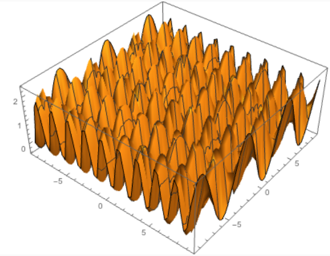


$n = 500$



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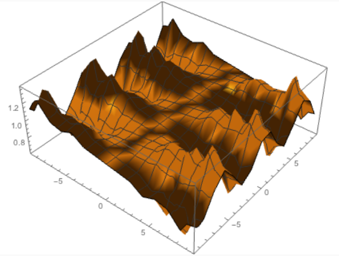

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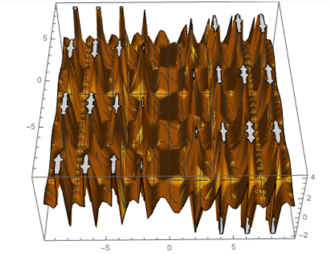

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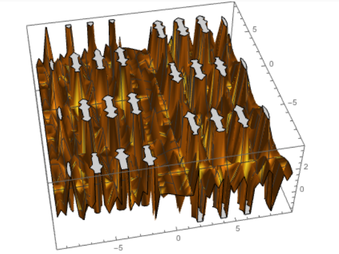

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- There is a saddle regardless of ζ
- The system will move towards the saddle no matter what

Modeling Outside of NetLogo