Biomathematics? What's that all about?

Sebastian Haratyk

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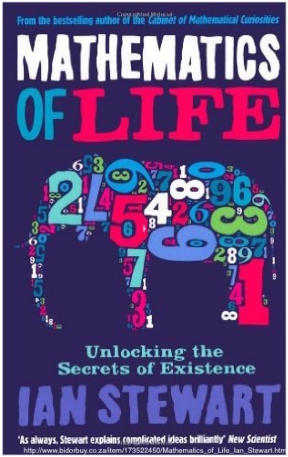

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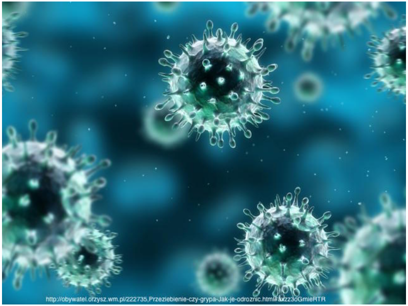

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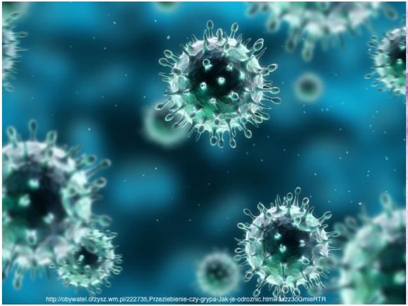

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Population models

Predator–prey models

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The most popular of predator-prey models is the one described by Lotka-Volterra equations.

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$$\frac{dN}{dt} = -\text{uptake} + \text{excretion} + \text{added } N,$$

$$\frac{dP}{dt} = \text{growth}(P) - \text{grazing} - \text{sinking} - \text{mixing},$$

$$\frac{dZ}{dt} = \text{growth}(Z) - \text{predation}.$$

$$\begin{cases} \frac{dP}{dt} = \beta P(1 - \frac{P}{K}) - \frac{P}{P+1} Z \\ \frac{dZ}{dt} = \gamma \frac{P}{P+1} Z - \delta Z, \end{cases}$$

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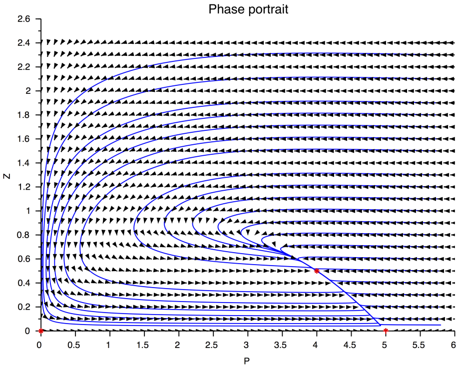

$$\beta = 0.5,\ \delta = 0.2,\ \gamma = 0.35,\ K = 5$$

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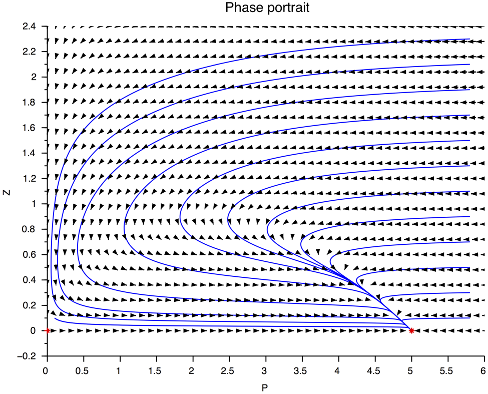

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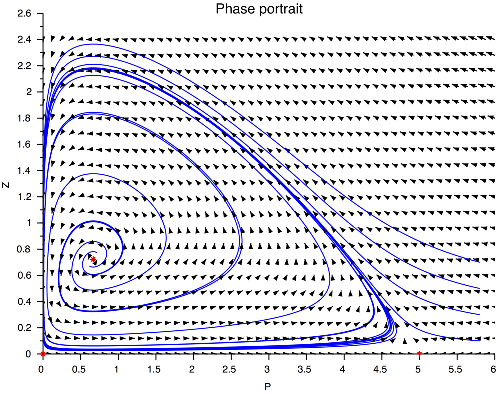

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