

Ecosystem Model

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R* Rule

$$\frac{dN_j}{dt} = N_j(a_j R - d)$$

$$\frac{dR}{dt} = r - R \sum_j a_j N_j$$

where N_j is the density of species j , R is the density of the resource, a is the rate at which species j eats the resource, d is species j 's death rate, and r is the rate at which resources grow when not consumed.

Input and output

- P_q, N_q, R_q - input vectors with plant quantity, vegetarian animals quantity and predator animals quantity
- P_g - plant growth rate
- V_g - vegetarian growth rate
- V_d - vegetarian death rate
- P_d - predator growth rate
- V_c - plant consuming rate
- P_c - animal consuming rate
- P_q^*, N_q^*, R_q^* - output vectors with plant quantity, vegetarian animal quantity, and predator animals quantity

Experiment

- Each cell has X number of units, one of them will be plant others are equally possible.
 X is random number from 4 to 7.
- Model shows realistic results, if none of resources are present, population decreases, otherwise it is increases.



**Thank you for
watching!**