Week 4: Copetition in context of the chemostat

Christian Berrig Amalia Bogri Jonas Bolduan

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Model description:

The general model for competition is:

$$\begin{aligned}\frac{dR_i}{dt} =& r_i\left(K_i - R_i\right) - \sum_j C(i,j)N_j \\ \frac{dN_j}{dt} =& C(i,j)N_j - d_j N_j\end{aligned}$$

where the functional response for the consumption function for consumer N_j w.r.t. resource R_i is given by respectively:

$$C(i,j) = \frac{\rho_j c_{max}}{\rho_j + c_{max}}$$

and the charecteristic resource consumption is:

$$\rho_j = \sum_i R_i b_{ij}$$

for substitutional resources and:

$$\rho_j = \min_i \left(R_i b_{ij}\right)$$

for essential resources.