Assignment 8

Consider the following model for a food chain consisting of a different number of nutrients and species that consume these nutrients. The species compete for the various nutrients.

$$\frac{dN_i}{dt} = N_i[\mu_i(R_1, \cdots, R_k) - m_i],\ i = 1 \cdots, n$$
$$\frac{dR_j}{dt} = D[S_j - R_j] - \sum_{i=1}^{n} c_{ji} N_i \mu_i(R_1, \cdots, R_k),\ j = 1, \cdots, k$$
$$\mu_i(R_1, \cdots, R_k) = \min\left(\frac{r_i R_1}{K_{1i} + R_1}, \cdots, \frac{r_i R_k}{K_{ki} + R_k}\right)$$

Calculate the behavior of the system with different parameterization:
a) 3 resources and 3 types
b) 5 resources and 5 types