From Generalized Lotka-Voltera (GLV):

Assuming has linear relationship with all species density:

GLV becomes:

To implement the growth rate in R, assuming a 3 species community with linear dependency of :

Where:

We can show the last term of the R code is indeed the last term of GLV by expanding its matrix form:

We can also assume a higher order dependency of on all species density:

GLV becomes: