

The Goby fish and shrimp problem Let g_n and s_n denote the number of goby fish and shrimp, respectively, in a population n years from now. Consider the model

$$g_{n+1} = g_n - \alpha g_n + \beta s_n$$

$$s_{n+1} = s_n - \gamma s_n + \delta g_n$$

Interpret the model; what do all the terms represent? Suppose $\alpha = .1$, $\gamma = .2$, $\beta = .1$, and $\delta = .1$. Simulate the system, starting with $g_0 = 150$ and $s_0 = 850$. What happens? What if we change β and δ to .3?