Interdisciplinary Nonlinear Dynamics (438)

Fall 2001

Hermann Riecke

Problem Set 2

For Discussion Section October 12

1. **Problems from Strogatz**

   Do 3.1.1, 3.1.3, 3.2.4, 3.4.8, 3.4.11, 3.4.12, 3.4.14, 3.4.15, 3.4.16.

2. **Population Growth with Eggs II**

   Consider again the dynamics of a population of animals that lay eggs and investigate numerically

   $$\frac{dN}{dt} = -N(t) - N(t)^2 + \alpha N(t - \tau) - \beta N(t - \tau)^2. \tag{1}$$

   Explore what happens to the oscillating solution you found in the last homework if you keep increasing the delay τ from $\tau = 3$ in not too large steps to at least $\tau = 15$, with $\alpha = 17$ and $\beta = 3.7$ fixed.