Math 464, Worksheet 21

We will use Excel to conduct experiments on the model from Worksheet 20:

\[
\Delta R = 0.02R \left(1 - \frac{R}{100}\right) - 0.002RF \\
\Delta F = 0.0004RF - 0.01F
\]

For each experiment you should keep the same initial numbers for rabbits and foxes, and you should vary ONLY ONE of the parameters of the model. As you conduct each experiment watch for any qualitative change in the behavior of solutions. I.e. change from cyclic to non-cyclic; one population dies out instead of surviving, etc. . . . It’s possible that nothing will change. If something does change, note what changed and what value of the parameter caused the change. Here are some suggestions for experiments.

1. Raise the death rate for foxes. What changes? At what value of the parameter does the change take place?

2. Lower the death rate for foxes. What changes? At what value of the parameter does the change take place?

3. Raise the birth rate for rabbits. What changes? At what value of the parameter does the change take place?

4. Lower the birth rate for rabbits. What changes? At what value of the parameter does the change take place?

5. Raise the parameter .0004 for foxes. What changes? At what value of the parameter does the change take place?

6. Lower the parameter .0004 for foxes. What changes? At what value of the parameter does the change take place?

7. Raise the parameter -.002 for rabbits. What changes? At what value of the parameter does the change take place?

8. Lower the parameter -.002 for rabbits. What changes? At what value of the parameter does the change take place?