Math 464, Homework 18

1. Find all equilibria for the model

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

2. Find all eigenvalues for the equilibrium that is NOT \( R = 100, F = 0 \). You should be able to convince yourself and me that your eigenvalues are complex.

3. Find all equilibria for the model

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

4. Find all eigenvalues for the equilibrium that is NOT \( R = 100, F = 0 \). You should be able to convince yourself and me that your eigenvalues are complex.

5. Find all equilibria for the model

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

6. Find all eigenvalues for the equilibrium that is NOT \( R = 100, F = 0 \). You should be able to convince yourself and me that your eigenvalues are complex.

7. Compute the absolute value of your eigenvalues. For what value(s) of \( b \) will you see cycles with constant amplitude?