Topics for the final exam

There will be more emphasis on the topics that were not covered by the midterm exams. Midterms covered Chapters 1-4.

1. **One-dimensional maps**: stability of fixed points, periodic orbits, logistic maps, itineraries, period 3 implies chaos.

2. **Two-dimensional maps**: Linear maps, coordinate changes, types of fixed points, phase portraits.

3. **Chaos**: Lyapunov exponents and numbers, conjugacy of logistic and tent maps, transition graphs.

4. **Fractals**: Cantor sets, fractal dimension, computing box-counting dimension.

5. **Chaos in two-dimensional maps**: Lyapunov exponents, Markov partitions, Horseshoe map, baker map.

6. **Chaotic attractors**: $\omega$ and $\alpha$-limit sets, chaotic attractors.

7. **Differential equations**: Linear and nonlinear systems. Motion in potential field, Lyapunov functions, Lotka-Volterra models.

8. **Periodic orbits and limit sets**: limit sets for planar ODEs, properties of $\omega$–limit sets. Poincare'-Bendixon theory.

9. **Chaos in ODEs**: Lorentz model.