

Here is a list of what you should know for the exam. I will list topics. You should look at the corresponding HW problems.

- Logistic population model.
- Phase lines. Bifurcation diagrams.
- Constant harvesting and bifurcations.
- Periodic harvesting.
- Poincare map
- Eigenvalues eigenvectors: Real and different , complex, repeated: How to use them to solve systems of equations
- Analysis of phase portraits.
- Equilibria and stability
- Changing coordinates matrix
- Solving systems $X' = AX$ using matrix exponentials.
- Trace determinant plane.
- Harmonic oscillators.
- Exponential matrix.
- Non-autonomous linear systems.