SF2720
About the final exam

Fall 2016

• There will be 6 questions in the exam out which you will be asked to choose 4 and submit them for grading. Out of 6 questions, 4 will be problems and 2 will be theoretical questions. To plepare for the exam please go through the homework problems and review the material covered in the lectures up until and including the lecture on Dec 6.

• The level of difficulty for the exam problems will be comparable to the level of the following homework problems:

Assignment 1: 2.3, 2.5, 2.8, 2.15, 3.2
Assignment 2: 1a, 1b, 2a, 3b, 4c, 5a, 5b
Assignment 3: 1, 4a
Assignment 4: 4.9, 4.16
Assignment 5: 4.18, 5.12, 5.16

• The level of the two theoretical questions will be comparable to the following questions*:

1. Prove minimality of irrational rotations on the circle.
2. Prove the theorem. If $k \neq 10^l$ where l is a natural number then there exists a power of k whose decimal representation begins with any given finite combination of digits.
3. Calculate the number of periodic points for the linear expanding maps E_m of the circle.
4. Prove the density of periodic orbits and invariance of the standard Cantor set for E_3.
5. Define topological transitivity and prove it for E_m maps. Semi-conjugacy of E_m to the shift space.
6. Define topological mixing and prove it for a hyperbolic automorphism of the two torus.
7. Define limit sets and prove forward (backward) invariance.
8. Define tpological entropy and compute it for the shift map on the space of one-sided sequances of 0's and 1's.
9. Define the rotation number and prove its topological invariance.
10. State the Poincare-Bendixson theorem.

*NOTE: these are just examples of possible questions and not the complete list of possible questions for the exam.