

Second Hour Exam Preparation

April 20, 2011

The second hour exam covers material from Sections 3.6, 4.1-4.4, 5.1-5.5, 6.1 and material from class notes on simplicial complexes and triangulations.

For the second midterm you should:

- be able to define the following terms and concepts. It is sufficient to be able to write logically correct definitions. It's not necessary to know definitions word for word.
- be able to use the following terms and concepts.
- be familiar with a collection of examples that illustrate the different terms and concepts. Many examples can be used to illustrate multiple terms and concepts.
- be able to prove simple properties of or relationships between terms and concepts.

Terms and Concepts

- path
- path connected set/space
- path component
- equivalence relation
- equivalence class
- set/space of equivalence classes
- identification space
- identification topology
- Möbius strip as an identification space
- torus as an identification space
- Klein bottle as an identification space
- projective plane as an identification space (three ways!)
- cone construction
- group
- subgroup
- normal subgroup
- conjugate subgroup
- coset
- topological group
- the real line as a topological group
- the circle as a topological group
- $GL(n)$
- $O(n)$
- $SO(n)$
- compact topological group
- group homomorphism
- group isomorphism
- left and right translation as homeomorphisms
- inversion as a homeomorphism
- normal subgroup

- generators for a group
- product of topological groups
- group action of a topological group on a topological space
- orbit space of a group action
- fundamental domain
- stabilizer subgroup
- transitive group action
- homotopy
- straight line homotopy/linear interpolation
- homotopy as an equivalence relation
- loop
- base point
- concatenation of paths
- fundamental group or the first homotopy group
- induced homomorphism
- fundamental groups of common spaces
- path lifting
- homotopy lifting
- homotopy type
- homotopy equivalence
- deformation retract
- contractible space
- fixed point
- Brouwer fixed point theorem
- k -simplex
- simplicial complex
- realization of a simplicial complex
- triangulation of a topological space
- triangulizable topological space
- subcomplex of a simplicial complex
- i -skeleton of simplicial complex
- star of a simplex
- link of a simplex
- simplicial manifold of dimension n
- topological manifold of dimension n
- simplicial manifold of dimension n with boundary
- the boundary of a simplicial manifold of dimension n
- subdivision or refinement of a triangulation
- Betti number
- Euler characteristic of a complex K , $\chi(K)$
- surface of genus g , X_g
- surface of genus g with boundary
- handle
- Euler characteristic of surface of genus g