

Differential Geometry 2, final exam topics

Szilárd Szabó

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- 1) Smooth submanifolds, equivalent characterizations: submersion, immersion diffeomorphism
- 2) Topological and differentiable manifolds
- 3) Tangent space of a differentiable manifold at a given point, derivations of a function at a point
- 4) The tangent bundle of a differentiable manifold, Lie-algebra of its vector fields
- 5) Integral curves of a vector field, the tangent map of a smooth map at a point
- 6) Homotopy, path-homotopy, deformation retraction
- 7) Fundamental group of a topological space
- 8) Functoriality and invariance properties of the fundamental group
- 9) Covering maps, lifting of paths and homotopies
- 10) The fundamental group of the circle, classical applications
- 11) The Seifert–van Kampen theorem and its applications