

Possible Term Paper Topics

Rigidity of convex polyhedra (Cauchy's theorem)

Flexibility of nonconvex polyhedra

Elementary Morse theory (critical points and topology)

Total curvature of space curves, knotted or unknotted

Nonexistence in \mathbb{R}^3 of complete surfaces with G. curvature $\equiv -1$ (Hilbert)

Closed geodesics on a compact, convex surface

Minimal surfaces (definition, interesting examples)

Infinitesimal rigidity of strongly convex surfaces

Submanifolds in higher dimensions

Conformal coordinates ("isothermal parameters")

and Riemann surfaces [needs \mathbb{C} and complex analysis]

Open complete surfaces of positive curvature and Cohn-Vossen inequality ($\int K d(\text{area}) \leq 2\pi$)

Classification of Compact Surfaces

Construction of compact surfaces of genus ≥ 2 with G. curv. $\equiv -1$ (via hyperbolic geometry)

Hyperbolic trigonometry (via derivatives of the distance function)