

Aufgabe 7

30.11.10

Notiztitel

Mathematical Gauge Theory WS 10/11

Let $M = S^2$ the two-sphere as a submanifold of \mathbb{R}^3 and consider the Riemannian metric on TS^2 induced by the standard euclidean metric of \mathbb{R}^3 . Let D be the Levi-Civita connection on $TM \rightarrow M$.

- Describe the Christoffel symbols and the geodesic equation explicitly with respect to local coordinates (e.g. stereographic projection).
- Show that the great circles are the geodesics.
- Determine the parallel transport $T_N M \rightarrow T_N M$ along geodesic triangles. It is a rotation with respect to an angle which is given by the triangle's data.
- Determine the holonomy group $G(N)$.
- Determine the curvature operator F .
- Discuss the corresponding case $S^n \subset \mathbb{R}^{n+1}$.