

Geometrische Topologie

Übungsblatt 9

Aufgabe 1. Use the branched covering from Aufgabe 3 on Übungsblatt 4 to construct a 3-fold branched covering $S^2 \rightarrow S^2$ with four branch points (in the S^2 on the right), each of which has two preimages.

Aufgabe 2. Show that the subset of $\mathbb{C}\mathbb{P}^2$ defined by the homogeneous polynomial

$$F(x, y, z) = y^2z - x(x - z)(x - 2z)$$

is a smooth (i.e. nonsingular) 2-torus.

Aufgabe 3. Show that for every $n \in \mathbb{N}$, $n \geq 2$, there is an n -fold branched covering $S^3 \rightarrow S^3$, branched along the unknot.

Aufgabe 4. Find the closed, orientable surface that is a 2-fold unbranched cover of the connected sum of n copies of $\mathbb{R}\mathbb{P}^2$, $n \in \mathbb{N}$.