TECHNISCHE UNIVERSITÄT BERLIN
Institut für Mathematik

Berlin Mathematical School

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Complex Analysis II / Geometry III - WS 12
Riemann Surfaces: Classical and Discrete

www3.math.tu-berlin.de/geometrie/Lehre/WS12/ComplexAnalysisII/

Exercise Sheet 4

Exercise 1. (6 points)

Describe the fundamental group of a compact Riemann surface of genus g with N punctures by generators and relations.

Exercise 2. (7 points)

On the compact Riemann surface of genus 2, write the homotopy class of γ as a product of the generators $[a_1], [b_1], [a_2], [b_2]$.

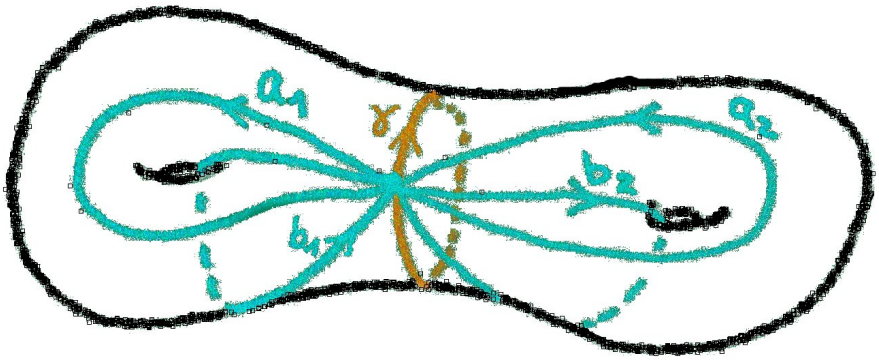

Figure 1: Riemann surface of genus 2 with oriented curves $a_1, b_1, a_2, b_2, \gamma$

Exercise 3. (7 points)

Consider a $4g$-gon G_g where opposite edges are topologically identified in such a way that the orientations of these two edges with respect to G_g are different.

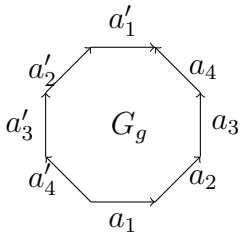

Figure 2: Polygon G_g for $g = 2$

a) Calculate the intersection numbers between two curves a_i and a_j.

b) Find a canonical basis for the homology of this Riemann surface.

Due: Tutorial on 21 November, 2012.