

## Homework 6

1. List all coverings of the bouquet of two circles with the number of sheets equal 2.
2. Find the simplest non-regular covering of the bouquet of two circles. Describe it, and prove that it is not regular.
3. Calculate the fundamental group of the space of quadratic polynomials  $x^2 + px + q$  with complex  $p, q$  and no double root. Does there exist a one-dimensional cellular space homotopy equivalent to this one?
4. Calculate the fundamental groups of a handle and a sphere with three holes. Are these spaces homotopy equivalent?