Reeb graphs and epimorphisms onto free groups

Łukasz P. Michalak
Seminar za geometrijsko topologijo, 22.11.2023

The Reeb graph of a Morse function on a closed manifold is obtained by contracting each connected component of its level sets. We will present the basic properties of Reeb graphs, conditions under which a graph can be realized as the Reeb graph of a Morse function and the relations with epimorphisms onto free groups. In particular, we will show how the number of vertices of degree 2 in Reeb graphs is strongly related with the topology of the manifold using Heegaard splittings and finite presentations of 3-manifold groups.