Fachseminar *Differentialgeometrie* (Math.)
Seminar *New developments in geometry* (Math.Phys.)

Aubry-Mather theory in two dimensions

Winter Term 2024/25

Monday 15:15 – 16:45, Paulinum P 701

Please enrol in **Moodle**

Students:

- mathematics

- mathematical physics (M.Sc.), it is a compulsary elective course in the mathematical physics program (10-MAT-MPHSG).

Topics:

For the following three different topics from differential geometry, dynamical systems and solid state physics there is a common variational problem, which will be discussed:

- Geodesics on a 2-dimensional torus

- Dynamics of a monotone twist map of an annulus

- The discrete Frenkel-Kontorova model

Reference:

V. Bangert, Mather sets for twist maps and gedesics on tori, *Dynamics reported,* 1, 1-56 (1988)

List of talks

1. The variational problem and basic facts about circle homeomorphism, Section 1, p. 4-12

2. The rotation number of a minimal trajectory and minimal trajectories with irrational rotation number, Section 2,3, p. 12-19

3. The structure of the set of minimal trajectories with irrational rotation number, Section 4, p.19-26

4. Applications to geodesics, Section 6, p.26-34

5. Applications to monotone twist maps, Section 7, p.34-42

6. The discrete Frenkel-Konotorva model and examples, Section 8, 9, p. 42-54