

LTCC Basic Course

Title: Morse theory, topology and robotics (MTTR)

Basic Details:

- Core Audience: 1st year PhD students, pure or applied maths
- Course Format: 5 x 2hr lectures

Course Description:

- Keywords: Manifolds, Smooth functions, Flows and Dynamical systems, Morse functions, Morse inequalities, Configuration spaces of mechanisms, Mechanical Linkages
- Syllabus: The course will start with basic material about manifolds and smooth functions. We shall cover the main theorems illustrating Morse theory and its applications to problems of topology, robotics and engineering. The content and style of the presentation will depend on the background and interests of the students. We plan to present the material in such a way that a variety of students will be able to enjoy the course.
- Recommended reading: Notes will be provided.
- Additional Optional reading:
 - M. Hirsch, Differential topology, 1976
 - J. Milnor, Morse theory. 1963;
 - M. Farber, Invitation to topological robotics, EMS, 2008.
- Prerequisites: Basic topology course, basic notions of algebraic topology

Format:

- Lecture notes will be provided.
- Some lecture videos will also be available.

Lecturer Details:

- Lecturer: Professor Michael Farber
- Lecturer home institution: Queen Mary University of London, School of Mathematical Sciences
- Lecturer e-mail: M.Farber@qmul.ac.uk