## HOMOLOGY: THEORETICAL AND COMPUTATIONAL ASPECTS

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**Generalized persistent homologies:**
**Introduction and motivation**

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**Exercises on Basic Persistence**

1. Compute the persistence diagrams of the size pair $(X, f)$ where $X$ is a figure 8 embedded in the "natural" way in a Cartesian plane, and $f$ is ordinate.

2. Same thing, but with $f$ as the abscissa.

3. Let $X$ be a cube of side length 2, embedded into a Cartesian space with centre in the origin and sides parallel to coordinate axes; let $f : X \to \mathbb{R}$ be the absolute value of $x$. Compute all persistence diagrams of $(X, f)$.

4. Recognize the objects of

   `http://www.ipet.gr/˜akoutsou/benchmark/`

   as size pairs $(X, f)$ and invent operators $F$ to other size pairs (see slide 20 by M. Ferri), apt to compare, classify, retrieve those shapes.