Applications of Singularities — São Carlos, 2016
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This will be an introductory course for people with no previous knowledge of Singularity Theory. The aim is to discuss examples that illustrate the way this theory may be applied, and motivate its study. For this, each lecture will be concerned with an application in a different context. Symmetries and connections with Dynamical Systems may also be discussed.

Examples of topics to be treated are:

1) Stability of floating objects (or how to sink a ship). The same models may be applied to study optics and the shape of caustics.

2) Elastic structures and symmetry breaking (or how to break a bridge).

3) Zeeman and Poston catastrophe machines (or how you can also learn from toys).

4) Crystal symmetries and pattern formation (or how the zebra gets its stripes and the jaguar gets its spots).

5) Dynamics with two time scales and applications to neurobiology (or how to get nervous very fast).

References:

- T. Poston, I. N. Stewart , *Catastrophe Theory and its Applications*, Pitman 1978
- M. Golubitsky, I. N. Stewart *The Symmetry Perspective*, Birkhäuser, 2002
- J.D. Murray, *Mathematical Biology*, Springer. 2002