

Geometric singularities

Eggers, Jens; University of Bristol

We give an overview of singularities which arise from the smooth deformation of curves or surfaces. These singularities have a universal unfolding, described by a finite number of parameters. We emphasize the scaling properties near singularities, characterized by similarity exponents, as well as scaling functions, which describe the shape. In the case of plane curves, we are able to describe the formation of cusps, or the separation of a small bubble in free-surface flow. In higher dimensions, we focus on the formation of caustics and shock waves. We are interested particularly in connecting the geometric description to the solution of the PDE describing a physical phenomenon, and aim to describe the successes and failures of this approach.