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Geometric partial differential equations: Surface and bulk processes

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Abstract

Geometric partial differential equations are a flourishing research area at the interface between differential geometry and pde theory. These equations arise from a variety of problems, and describe a host of phenomena. One traditional and important source for such equations are minimization problems involving geometric objects like curves or surfaces. Such problems -along with suitable gradient flows- typically give rise to a highly nonlinear pde for the variable describing the curve or surface. A different starting point, which is a very active research area, concerns the study of pdes *on* stationary or evolving surfaces. Additionally, these equations can be coupled with other pdes *in* the domain bounded by the surface, and together, these pdes may drive the surface itself. Hence determining its position becomes part of the unknown variables. Such *geometric pde systems* often model physical interfaces or membranes.

The aim of this workshop is to bring together experts in the field covering a wide variety of aspects bridging analysis, computational issues, and real-life applications in areas such as astrophysics, materials science, multi-phase flow, image processing or the description of biological cells.