PARTIAL DIFFERENTIAL EQUATIONS ON SURFACES: ANALYSIS AND NUMERICAL METHODS

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In this presentation we give an overview of several aspects related to the analysis and numerical simulation of elliptic and parabolic PDEs on (evolving) surfaces. One topic that will be addressed is a well-posed space-time weak formulation of a parabolic transport problem on an evolving surface. This formulation is used as the basis for a specific space-time trace Finite Element discretization method. The results that we present are a summary of the ones obtained in [1, 2, 3]. A second topic that we treat is a general numerical technique for computing higher order finite discretizations of PDEs on an implicitly given surface (e.g., via a level set function) [4]. Finally we discuss some recent results on the modeling of fluid problems on surfaces and the corresponding (weak) formulation of surface Stokes and Navier-Stokes equations [5].

References

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