

ACMS Applied Math Seminar

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Thursday, November 15, 2018
154 Hurley Hall
3:30 – 4:30 PM



A Numerical Methods For Solving Elliptic Equations On Real Closed Algebraic Curves and Surfaces

We develop a novel approach which combines numerical algebraic geometry and finite difference scheme to solve elliptic partial differential equations defined on real closed algebraic curves and surfaces. In particular, we use the numerical algebraic methods to discretize the domain then utilize local parameterization to design a special metric tensor which greatly simplifies the Laplacian-Beltrami operator on the local manifold at every mesh point. Finally, we apply standard finite difference scheme to the simplified differential equation system. The performance of this method is demonstrated through elliptic PDEs defined on smooth or singular closed algebraic sets.

The Department of Applied and Computational
Mathematics and Statistics

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