

MESHFREE FINITE DIFFERENCE METHODS FOR NONLINEAR ELLIPTIC EQUATIONS

BRITTANY FROESE
NEW JERSEY INSTITUTE OF TECHNOLOGY

Abstract. We describe a framework for constructing monotone finite difference approximations for a class of nonlinear elliptic operators. These approximations are defined on unstructured point clouds, which allows for computation on non-uniform meshes and complicated geometries. Because the schemes are monotone, they fit within the Barles-Souganidis convergence framework and can serve as a foundation for higher-order filtered methods. Computational results for several nonlinear PDEs validate the approach.