1108-35-136   **Seonghak Kim*** (`kimseo14@msu.edu`), 619 Red Cedar Road, East Lansing, MI 48824, and **Baisheng Yan**. *Convex integration and infinitely many weak solutions to the Perona-Malik equation in all dimensions.*

We study the forward-backward parabolic Perona-Malik equation in image processing with the homogeneous Neumann boundary condition on an n-dimensional smooth bounded convex domain. Our approach is motivated by a reformulation of the n-dimensional Perona-Malik equation as a nonhomogeneous partial differential inclusion with linear constraint. Based on a functional setup appropriate for the Baire category method, an explicit formula of the lamination convex hull of the matrix set involved, and a new convex integration method overcoming the difficulty due to some uncontrollable components of gradient in the differential inclusion when dimension $n \geq 2$, we establish the main result that for suitable nonconstant smooth initial data the initial-boundary value problem possesses infinitely many Lipschitz continuous weak solutions. We also introduce some recent generalized results. (Received January 07, 2015)

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