1086-35-2916 **V. B. Surya Prasath*** (prasaths@missouri.edu), Department of Computer Science, University of Missouri-Columbia, Columbia, MO 65211, and **Jose Alberto Iglesias Martinez** and **Dmitry Vorotnikov**. *On Generalized Perona–Malik Diffusion Equations in Image Processing.*

The Perona–Malik diffusion (PMD) widely used in various image processing tasks [Perona, P., Malik, J.: Scale-space and edge detection using anisotropic diffusion. IEEE Trans. Pattern Anal. Mach. Intell. 12(7), 629–639 (1990)] is an ill-posed [Kichenassamy, S.: The Perona-Malik paradox. SIAM J. Appl. Math. 57(5), 1328–1342 (1997)] nonlinear parabolic equation of the form

$$\frac{\partial u}{\partial t} = div\left(g\left(|\nabla u|\right)\nabla u\right) \quad \text{with} \quad u(0) = u_0$$

where $g : [0, \infty) \to [0, \infty)$ is the diffusion function, e.g., $g(s) = (1 + (s/K)^2)$ with $K > 0$ a parameter and $u_0$ is the noisy input image. We study a related PDE of the form

$$\frac{\partial u}{\partial t} = div\left(\frac{\phi'(|\nabla u|)\nabla u}{1 + K\left|G_\sigma \star \nabla u\right|^2}\right)$$

where $\phi : \mathbb{R} \to [0, \infty)$ is an even and convex function. We study the above model and provide detailed analysis of the scheme. The purpose of this talk is to highlight important new results in this regard, and update the status of some of the related problems of such generalized PMD equations, and add some new problems to the list of open and unsolved problems in this area. (Received September 26, 2012)