962-35-1065 **Martin Rumpf*** (rumpf@iam.uni-bonn.de), Prof. Dr. M. Rumpf, Institut fr Angewandte Mathematik, Universitt Bonn, 53115 Bonn, Germany. *Anisotropic Geometric Diffusion in Surface Processing.* Preliminary report.

Discrete surfaces as they are delivered from 3D scanning devices or level sets in 3D data sets from medical imaging tools are often noisy. Thus, techniques are required which allow the fairing of these surfaces without destroying important features such as corners or edges. First, We carry over image processing methodology to surfaces and consider suitable anisotropic curvature evolution problems for surfaces M described by their parameterization x:

$$\partial_t x - \operatorname{div}_M \left(A \nabla_M x \right) = f \,,$$

or their level set representation:

$$\partial_t \phi - |\nabla \phi| \operatorname{div} \left(A \frac{\nabla \phi}{\nabla \phi} \right) = 0 \,.$$

Here the diffusion tensor A depends on the shape operator, i. e. the principal directions of curvature and the principle curvatures. I. e. near edges on the surface, indicated by a large ratio between the principle curvatures we enable tangential smoothing along the edge and a sharpening in the perpendicular direction. Furthermore, a proper choice of the right hand side f in the first equation guarantees the conservation of volume. The corresponding algorithms apply to triangular surfaces and level sets on 3D adaptive finite element grids respectively. (Received October 02, 2000)