

A Simple APS RevTeX Article

J. C. Stenerson

600 Ericksen Avenue NE, Suite 300, Bainbridge Island, WA 98110

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Abstract

Replace this text with the abstract of your paper.

I. INTRODUCTION

Prof. Kiehn:

Can you read this in your version of Scientific Word?

If you can, we have a good way to communicate. I can even send whole documents in LaTeX a la Scientific Word.

You assume a 1-form A is a given normal vector field to a hypersurface. You normalize it, defining

$$a = A/kAk = a_i dx^i \quad (1)$$

The result is a 1-form which is homogeneous of degree one and whose coefficients, a_i , are homogeneous of degree zero.

Next you define a linear transformation by computing the Jacobian matrix

$$J = \frac{\partial a_i}{\partial x^j} \quad ; i, j = 1, 2, 3, 4 \quad (2)$$

The invariants of a particular rank 3 submatrix of J include the trace which is the mean curvature H and the determinant which is the Gaussian curvature K . That is, in 4D, we have a rank 3 matrix, so there are three invariants formed from the eigenvalues or principal curvatures. If the submatrix of the Jacobian is self-adjoint (or real symmetric) these eigenvalues will be real and things are nice.

We then compute the the adjoint defined as

$$Ad(J) = \text{transpose}(\text{matrix}(\text{cofactors}(J))) \quad (3)$$

You next form (self-adjointness) a vector j by multiplying the components of the homogeneous normal field by $Ad(J)$

$$j = aJ = a\text{Ad}(J) \quad (4)$$

At this point I don't see how this is a $(N-1)$ -differential form, j , and there are some questions about the steps and their assumptions....But proceeding, we get a 2-form G and j is conserved: $dj = d^2G = 0$.

If everything stays nice (we use the root structure of the Jacobian to determine this) we have a way of defining an outward normal except at bifurcations of the root structure.

Am I starting to get the picture?