CDS 301 Spring 2013
Scientific Information and Data Visualization

Homework #7

Assignment Date: April 02, 2013
Due Date: April 09, 2013

1. Curvature tensor

For the continuous function z=sin(x)cos(y)

(1) Obtain its gradient at points P1=(0,0) and P2=(1,1)?
(2) Obtain its Hessian matrix at points P1=(0,0) and P2=(1,1)?
(3) For point P1=(0,0), calculate the curvatures along the direction S with $\alpha=0°$ and $\alpha=60°$ respectively, where α is the angle between the direction vector S and the X-axis.
(4) Repeat the tasks in (3) for the point at P2=(1,1)

2. Eigenvalue and Eigenvector.

For the given matrix that characterize a tensor in 2-D,

$$H = \begin{pmatrix} 1, & 3 \\ 2, & 2 \end{pmatrix}$$

(1) Calculate its eigenvalues?
(2) Calculate the corresponding eigenvectors?

Submission: in class and paper only