ME 7953: Simulations in Materials

Fall 2002

Problem Set 1

Problems are due at the beginning of the class, Wednesday, 9/4/2002.

1) In MATLAB, vector **a** and **b** are given as below,

```
>> a=[1,2,3]

a =

     1     2     3

>> b=[4,5,6]

b =

     4     5     6
```

   (1) Write down the MATLAB formula to calculate the dot product of **a** and **b**.
   (2) Write down the MATLAB formula to calculate the cross product of **a** and **b**.

2) Read MATLAB tutorial on subroutines from the course webpage. Complete the following MATLAB subroutine:

function [normalStress,shearStress] = findStresses(stressMatrix, surfaceNormal)
% This subroutine will calculate the normal stress vector and shear stress vector,
% acting on a surface with normal vector given in surfaceNormal, from the give
% stress matrix stressMatrix.

3) Test the above code with

```
sigma = [1,2;2,1];
n = [1/sqrt(2),1/sqrt(2)];
[normal,shear] = findStresses(sigma,n)
```

and write down the MATLAB response.