

Assignment 4

Question

If $f = x^2 + y^2 + z^2$ and $F = xy\hat{i} + yz\hat{j} + zx\hat{k}$, then find $\text{grad}(f)$, $\text{div}(F)$ and $\text{curl}(F)$

Code

```

1  syms x y z;
2  f = x.^2 + y.^2 + z.^2;
3  F = [x*y, y*z, z*x];
4  disp('Scalar Function f = ');
5  disp(f);
6  disp('Vector Function F = ');
7  disp(F);
8  grad_f = gradient(f,[x,y,z]);
9  disp('grad(f) at (x,y,z) = ');
10 disp(grad_f);
11 div_F = divergence(F,[x,y,z]);
12 disp('div(F) at (x,y,z) = ');
13 disp(div_F);
14 curl_F = curl(F,[x,y,z]);
15 disp('curl(F) at (x,y,z) = ')
16 disp(curl_F);

```

Output

```

>> Assignment_4
Scalar Function f =
x^2 + y^2 + z^2

Vector Function F =
[x*y, y*z, x*z]

grad(f) at (x,y,z) =
2*x
2*y
2*z

div(F) at (x,y,z) =
x + y + z

```

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curl(F) at (x,y,z) =  
-y  
-z  
-x  
>>
```