

MATLAB EXPERIMENT-7

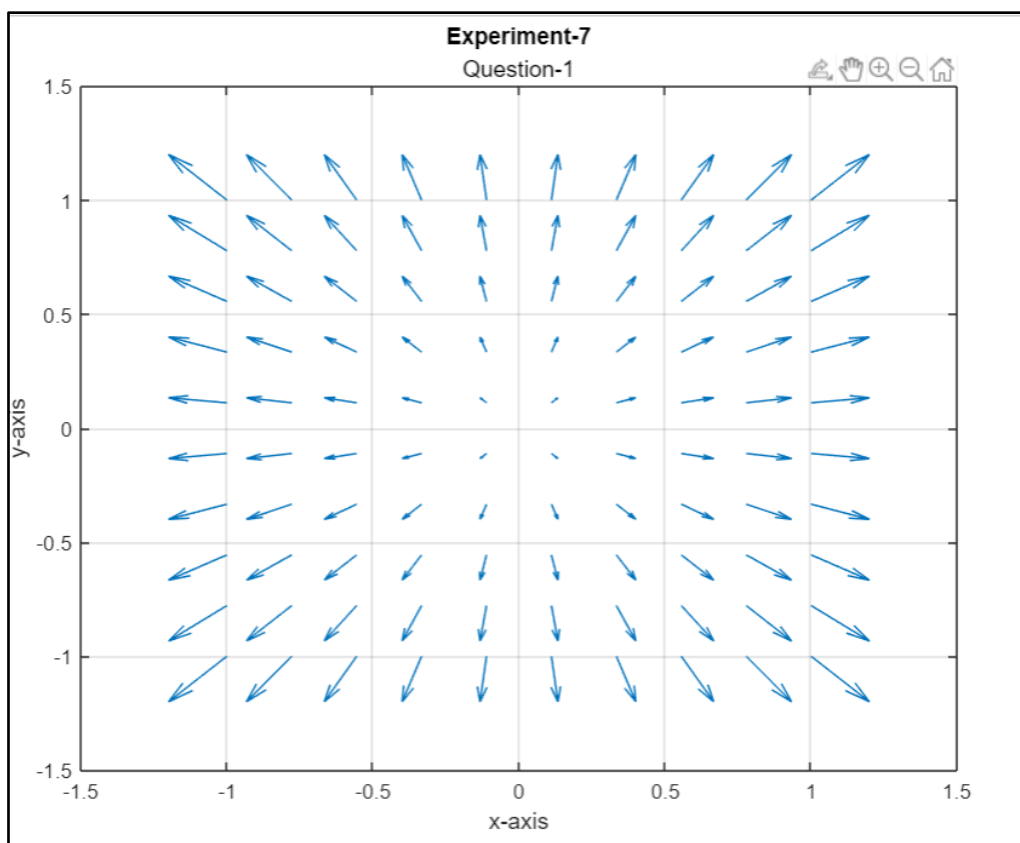
BY-20BCE1209

Q-1 Draw two dimensional vector field $x\mathbf{i}+y\mathbf{j}$

CODE :-

```
clc
clear
syms x y real
f=[x,y];
f1=inline(vectorize(f(1)),'x','y');
f2=inline(vectorize(f(2)),'x','y');
x=linspace(-1,1,10);
y=x;
[X,Y]=meshgrid(x,y);
p=f1(X,Y);
q=f2(X,Y);
quiver(X,Y,p,q,1),grid on,title Experiment-7 Question-1;
xlabel x-axis
ylabel y-axis
```

OUTPUT :-

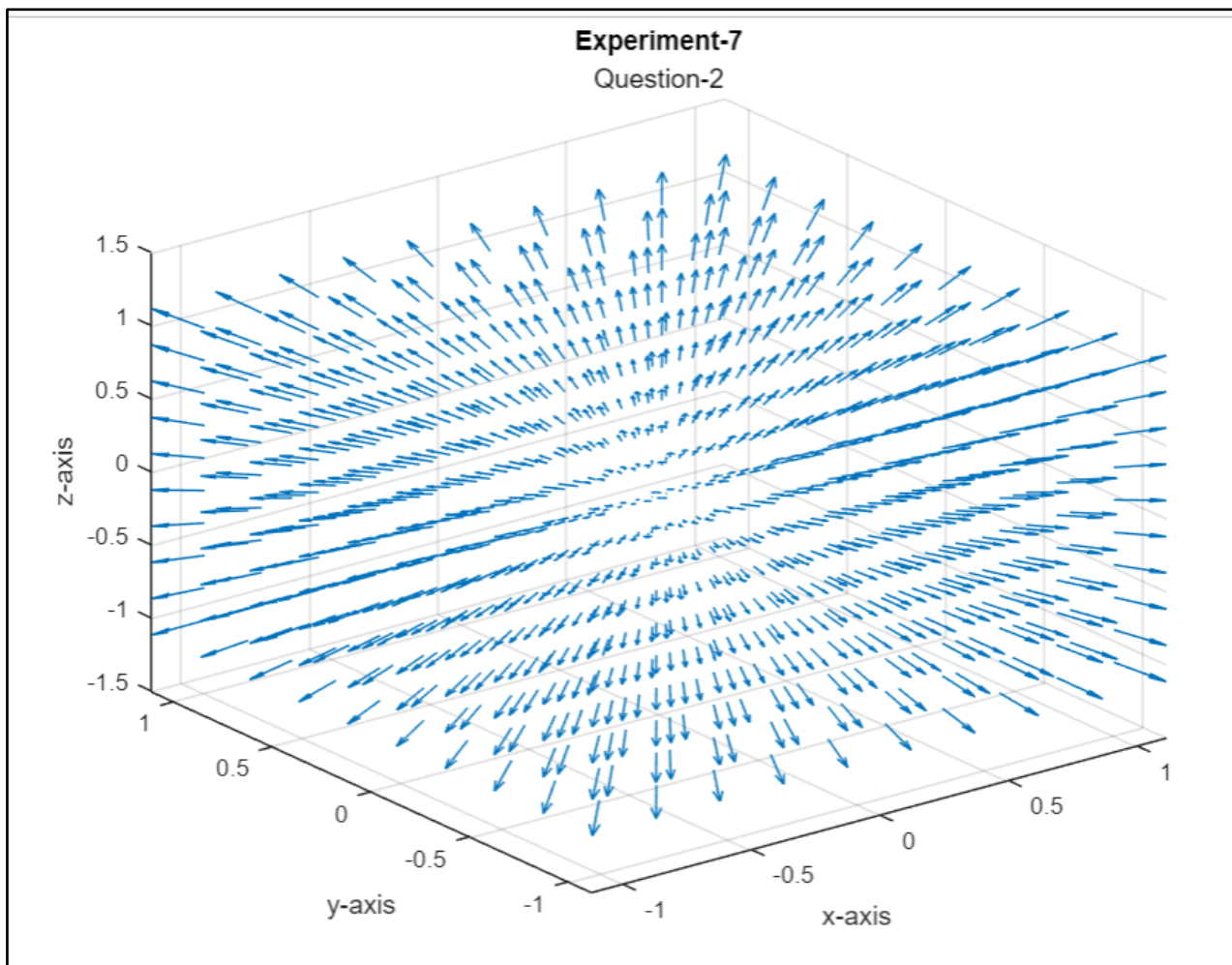


Q2 Draw three dimensional vector field $xi+yj+zk$

CODE :-

```
clc
clear
syms x y z real
f=[x,y,z];
f1=inline(vectorize(f(1)),'x','y','z');
f2=inline(vectorize(f(2)),'x','y','z');
f3=inline(vectorize(f(3)),'x','y','z');
x=linspace(-1,1,10);
y=x;z=x;
[X,Y,Z]=meshgrid(x,y,z);
p=f1(X,Y,Z);
q=f2(X,Y,Z);
r=f3(X,Y,Z);
quiver3(X,Y,Z,p,q,r,1),grid on,title Experiment-7 Question-2;
xlabel x-axis
ylabel y-axis
zlabel z-axis
```

OUTPUT :-



Q3 Draw the gradient vector field for $f(x,y) = x^2y^3 - 4y$.

CODE :-

```
clc
clear
syms x y real
F=(x^2)*(y^3)-4*y;
fx=diff(F,x);
fy=diff(F,y);
f=[fx,fy];
fx=simplify(fx);
fy=simplify(fy);
sprintf("Grad of given function is (%s)i +(%s)j",fx,fy)
f1=inline(vectorize(f(1)),'x','y');
f2=inline(vectorize(f(2)),'x','y');
x=linspace(-1,1,10);
y=x;
[X,Y]=meshgrid(x,y);
p=f1(X,Y);
q=f2(X,Y);
quiver(X,Y,p,q,1),grid on,title Experiment-7 Question-3;
xlabel x-axis
ylabel y-axis
```

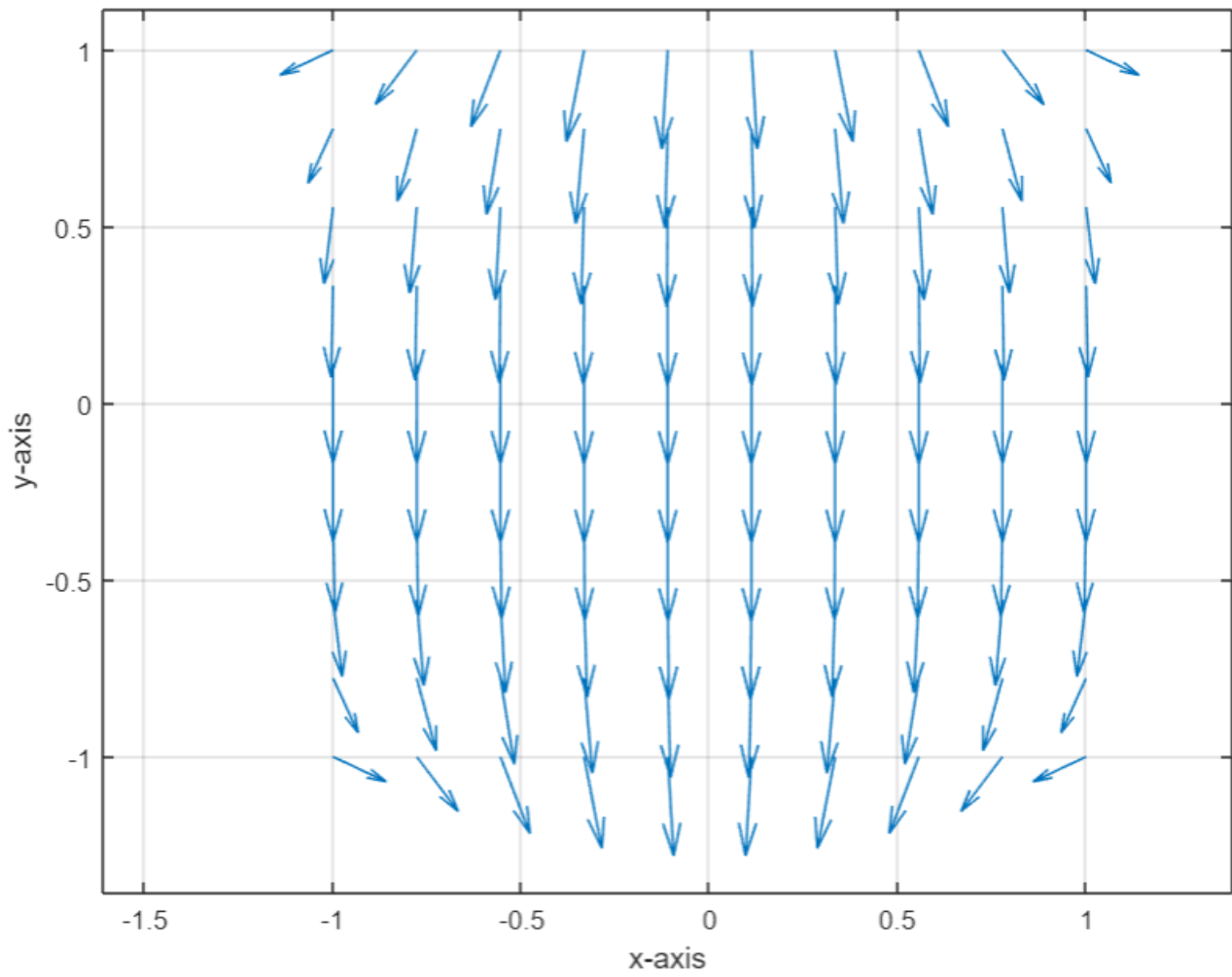
OUTPUT :-

COMMAND WINDOW

```
"Grad of given function is (2*x*y^3)i +(3*x^2*y^2 - 4)j"
```

```
>> |
```

Experiment-7
Question-3



Q4 Draw the gradient vector field for $f(x,y,z) = xy - yz^2 + zx^3$

CODE: -

```
clc
clear
syms x y z real
F=x*y-y*z^2+z*x^3;
fx=diff(F,x);
fy=diff(F,y);
fz=diff(F,z);
f=[fx,fy,fz];
fx=simplify(fx);
fy=simplify(fy);
fz=simplify(fz);
sprintf("Grad of given function is (%s)i +(%s)j+(%s)k",fx,fy,fz)
f1=inline(vectorize(f(1)),'x','y','z');
f2=inline(vectorize(f(2)),'x','y','z');
f3=inline(vectorize(f(3)),'x','y','z');
x=linspace(-1,1,10);
y=x;z=x;
[X,Y,Z]=meshgrid(x,y,z);
p=f1(X,Y,Z);
q=f2(X,Y,Z);
r=f3(X,Y,Z);
quiver3(X,Y,Z,p,q,r,1),grid on,title Experiment-7 Question-4;
xlabel x-axis
ylabel y-axis
zlabel z-axis
```

OUTPUT: -

COMMAND WINDOW

"Grad of given function is (y + 3*x^2*z)i +(x - z^2)j+(x^3 - 2*y*z)k"

Experiment-7
Question-4

