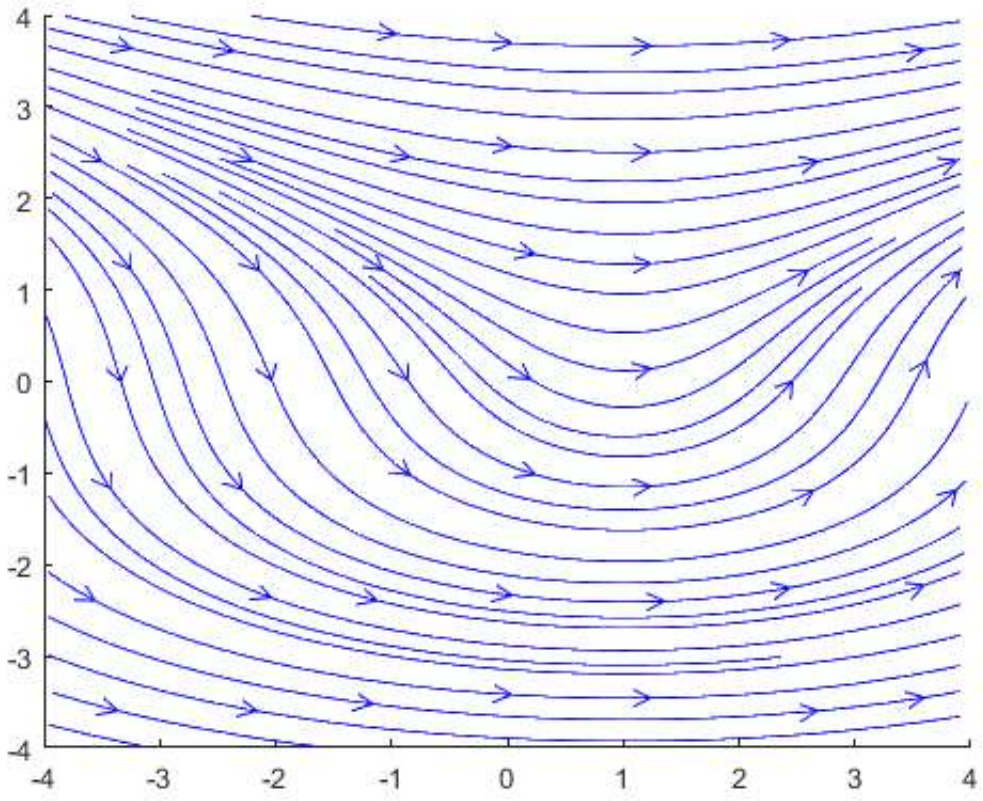
```
clc
clear all
syms x y c;
u(x,y)=(1+y^2);
v(x,y)=x-1;

stline=int(u,y)-int(v,x)+c

[x y]=meshgrid(-4:.4:4,-4:.4:4);
uu=u(x,y);
vv=v(x,y);
streamslice(x,y,uu,vv)
```

```
stline(x, y) =

c + (y*(y^2 + 3))/3 - (x*(x - 2))/2
```



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```
clc
clear
syms x y c

u(x,y)=(1/2)*x^2-(1/3)*x^3;
v(x,y)=x*(x-1)*(y+1);

p=diff(u,x)+diff(v,y);
if(p==0)
   disp('The motion is Possible')
else
    disp('The motion is not possible')
end

q=diff(v,x)-diff(u,y);
if(q==0)
    disp('The motion is irrotational')
else
    disp('The motion is rotational')
end

[x,y]=solve(u==0,v==0,x,y);
stagnation_points=[x,y]
```

```
The motion is not possible
The motion is rotational

stagnation_points =

[ 3/2, -1]
[   0,  0]
```

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```
clc
clear
syms x y c

u(x,y)=(1/2)*x^2-(1/3)*x^3;
v(x,y)=x*(x-1)*(y+1);

p=diff(u,x)+diff(v,y);
if(p==0)
   disp('The motion is Possible')
else
    disp('The motion is not possible')
end

q=diff(v,x)-diff(u,y);
if(q==0)
    disp('The motion is irrotational')
else
    disp('The motion is rotational')
end

[x,y]=solve(u==0,v==0,x,y);
stagnation_points=[x,y]
```

```
The motion is not possible
The motion is rotational

stagnation_points =

[ 3/2, -1]
[   0,  0]
```

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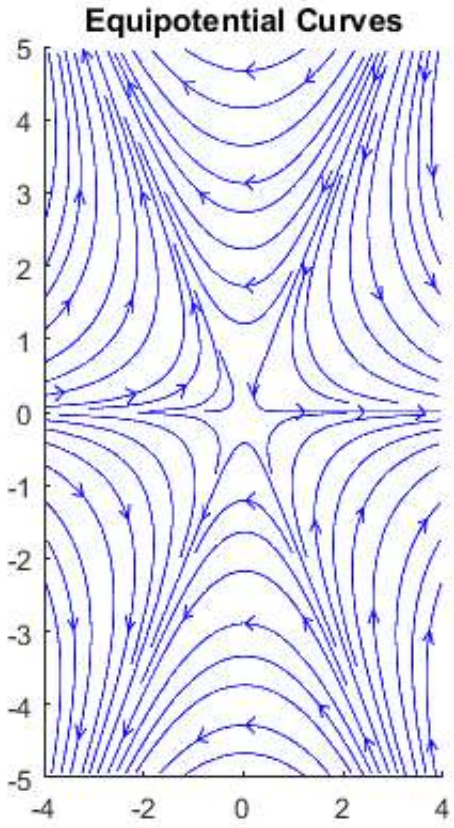
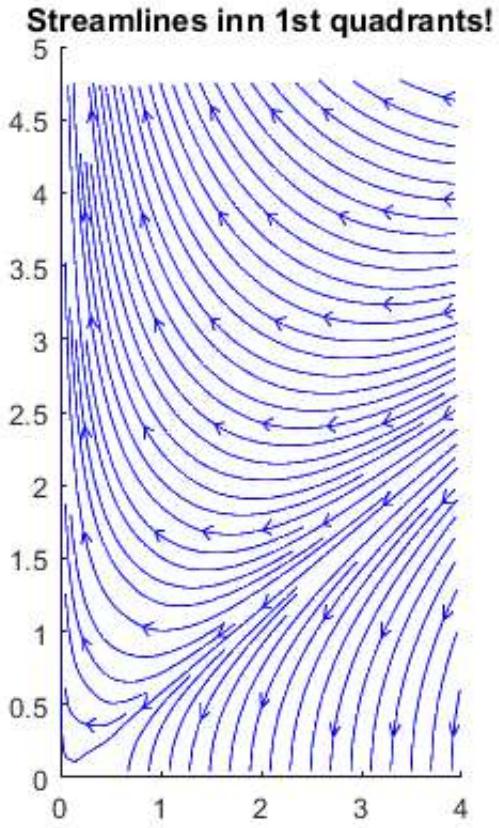
```
clc
clear
syms x y c
a=4;

phi(x,y)=a*x^3/3-a*x*y^2-2;

u=diff(phi,x);
v=diff(phi,y);

%(a)
subplot(1,2,1)
[x,y]=meshgrid(-4:0.4:4,-5:0.4:5);
uu=u(x,y);
vv=v(x,y);
streamslice(x,y,uu,vv)
title('Equipotential Curves')

%(b)
syms x y c
stfunction=int(u,y)-int(v,x)+c

%(c)
subplot(1,2,2)
[x,y]=meshgrid(0:0.4:4,0:0.4:5);
uv=v(x,y);
vu=-u(x,y);
streamslice(x,y,uv,vu)
title('Streamlines inn 1st quadrants!')
```

```
stfunction(x, y) =

8*y*x^2 + c - (4*y^3)/3
```





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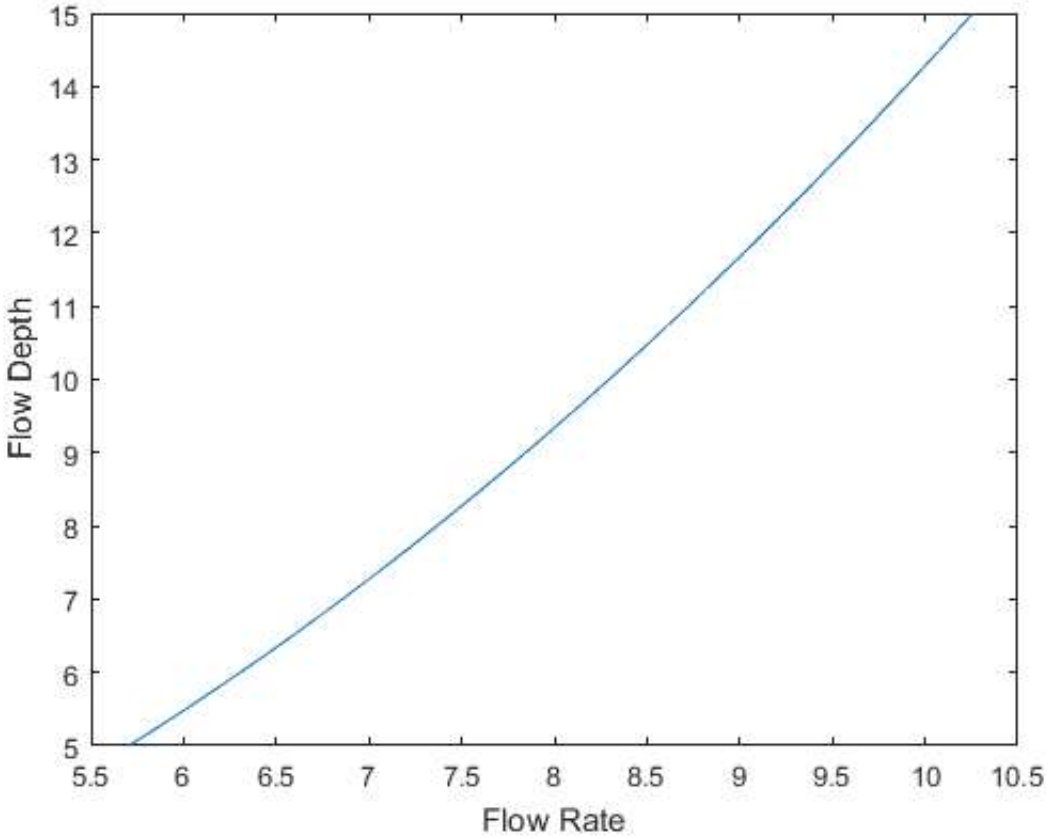
```
clc
clear

cc=0.61;
a=1;
z1=5;
g=9.81;
z2=cc*a;

%(i)
if(0.1<(a/z1) || 0.2>(a/z1))
    p=z2*sqrt(2*g*(z1-z2)/(1-(z2/z1)^2));
else
    disp('Change the value of a')
end
a
fprintf('The flow rate per unit width is :%f\n',p)

%(ii)
Z1=[5:0.25:15];
fprintf('   Z1        Q/b\n')
for i=1:length(Z1)
   q(i)=z2*sqrt(2*g*(Z1(i)-z2)/(1-(z2/Z1(i))^2));
   fprintf('%f  %f\n',Z1(i),q(i))
end
plot(q,Z1)
xlabel('Flow Rate')
ylabel('Flow Depth')
```

```
a =

     1

The flow rate per unit width is :5.703848
   Z1        Q/b
5.000000  5.703848
5.250000  5.859895
5.500000  6.012034
5.750000  6.160538
6.000000  6.305650
6.250000  6.447588
6.500000  6.586548
6.750000  6.722707
7.000000  6.856225
7.250000  6.987247
7.500000  7.115906
7.750000  7.242323
8.000000  7.366611
8.250000  7.488872
8.500000  7.609201
8.750000  7.727686
9.000000  7.844408
9.250000  7.959442
9.500000  8.072859
```

```
9.750000  8.184725
10.000000  8.295100
10.250000  8.404043
10.500000  8.511608
10.750000  8.617844
11.000000  8.722800
11.250000  8.826520
11.500000  8.929047
11.750000  9.030420
12.000000  9.130678
12.250000  9.229856
12.500000  9.327989
12.750000  9.425107
13.000000  9.521242
13.250000  9.616424
13.500000  9.710679
13.750000  9.804034
14.000000  9.896514
14.250000  9.988144
14.500000  10.078946
14.750000  10.168942
15.000000  10.258152
```



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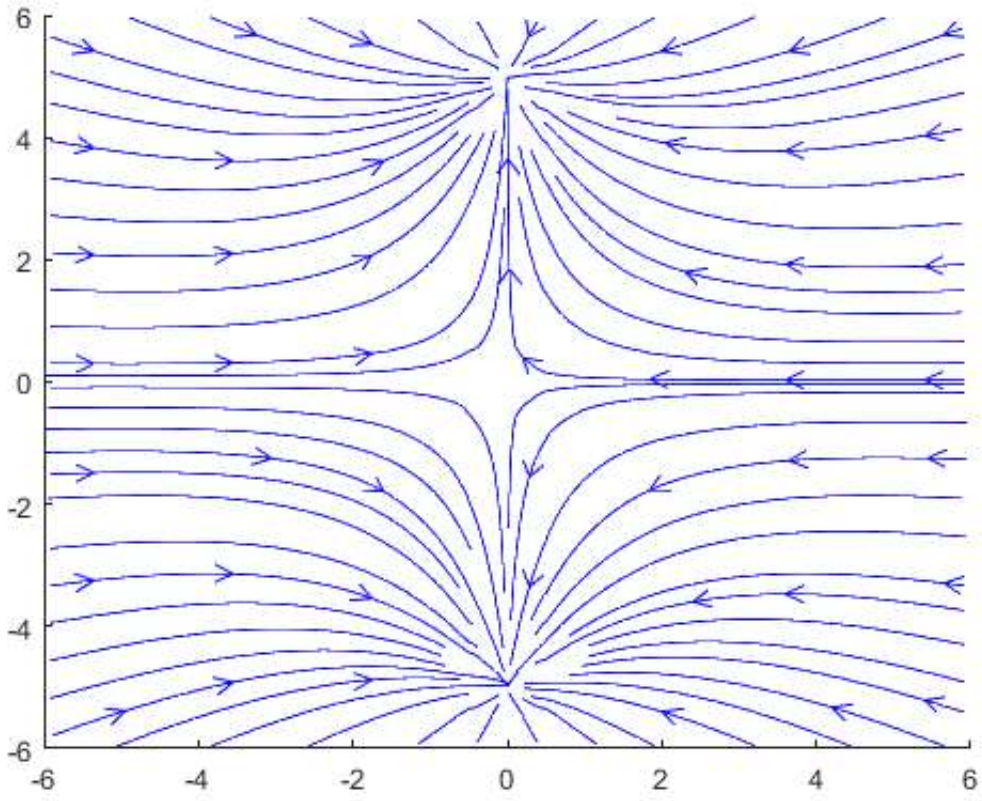
```
clc
clear all
m=-.314;

syms x y r t c;
u1=diff((m/2*pi)*log(sqrt(x^2+(y-5)^2)),x);
v1=diff((m/2*pi)*log(sqrt(x^2+(y-5)^2)),y);

u2=diff((m/2*pi)*log(sqrt(x^2+(y+5)^2)),x);
v2=diff((m/2*pi)*log(sqrt(x^2+(y+5)^2)),y);

u=simplify(u1+u2);
v=simplify(v1+v2);

f=int(u,y)-int(v,x)+c

fpolar=subs(f,{x,y},{r*cos(t),r*sin(t)})
[x y]=meshgrid([-6:.5:-0.5 .5:.5:6],[-6:.5:-0.5 .5:.5:6]);
ur=subs(u);
vr=subs(v);
streamslice(x,y,ur,vr)
```

```
f =

c + (157*pi*atan(x/(y - 5)))/1000 + (157*pi*atan(x/(y + 5)))/1000 - (157*pi*(atan(y/x - 5/x)
+ atan(y/x + 5/x)))/1000


fpolar =

c + (157*pi*atan((r*cos(t))/(r*sin(t) - 5)))/1000 + (157*pi*atan((r*cos(t))/(r*sin(t) + 5)))/
1000 - (157*pi*(atan(5/(r*cos(t)) + sin(t)/cos(t)) - atan(5/(r*cos(t)) - sin(t)/cos(t))))/100
0
```



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