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clean up

```
clear all
close all
clc
```

BLT1

SP1

```
clear all
close all
syms t x y
% U = @(t) [10*cos(10*t)*exp(-t);0];
Ux = 10*cos(10*t)*exp(-t);
Uy = 0;
psiy = int(Ux,y);
psix = -int(0,x);

yfun = matlabFunction(psiy);
yfun2 = @(t) .1.*cos(t.*1.0e+1).*exp(-t).*1.0e+1;
% xfun = matlabFunction(psix);
xfun = @(t) 0;
figure
fplot(xfun,yfun2,[0,10])
title("streamlines X Y")
xlabel("x [m]")
ylabel("y [m]")

figure
fplot(xfun,yfun2,[0,10])
title("pathlines X Y")
xlabel("x [m]")
ylabel("y [m]")

t = @(t) t;
figure
fplot3(xfun,yfun2,t,[0,10])
title("pathlines X Y t")
xlabel("x [m]")
ylabel("y [m]")
```

```
zlabel("t [s]")
```

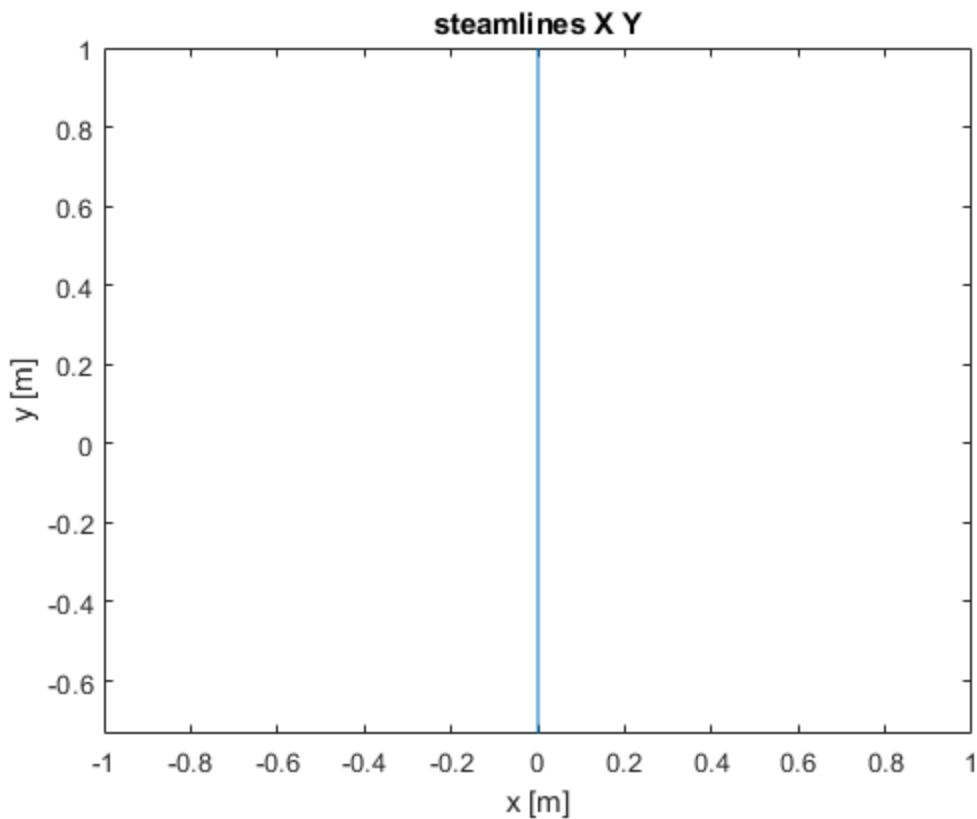
```
disp("the flows are unsteady beacuse e pathlines change with respect to time.  
It looks like it aproaching a steady flow around t = 8s.")
```

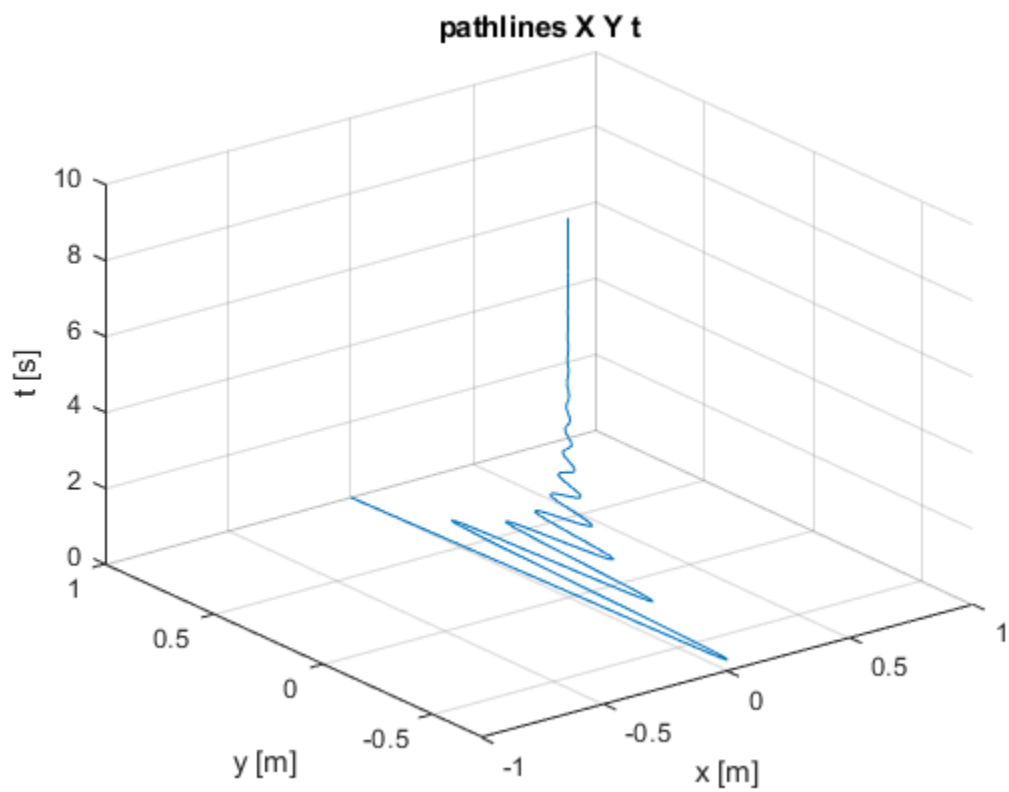
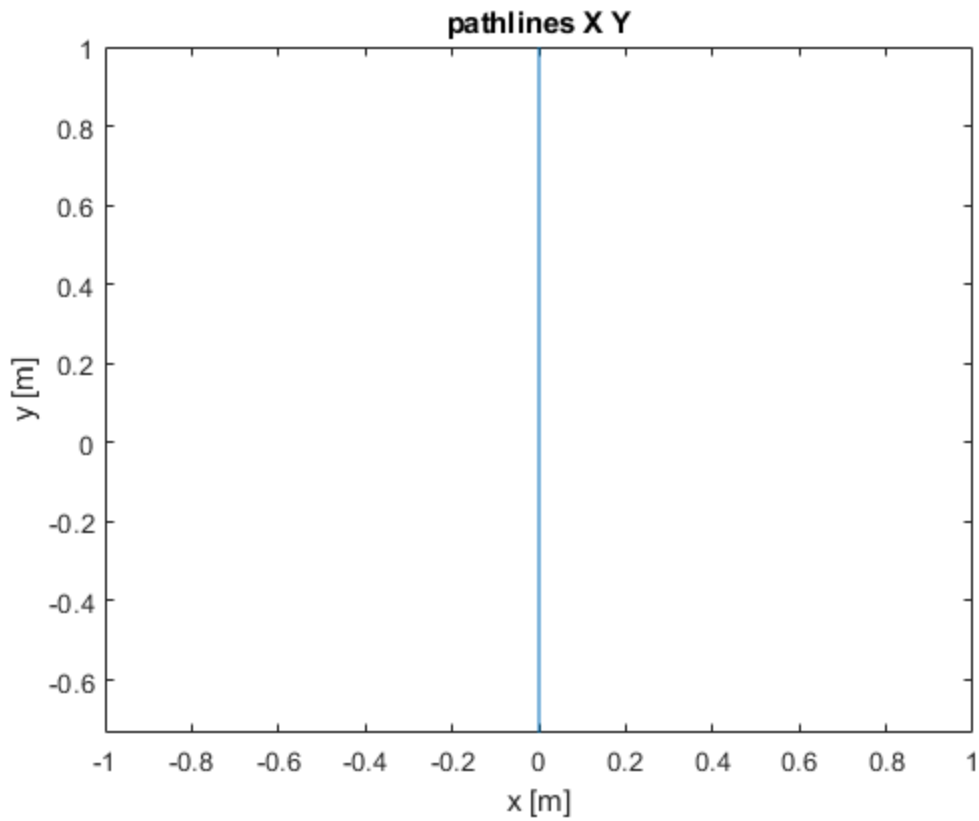
*Warning: Function behaves unexpectedly on array inputs. To improve performance,
properly vectorize your function to return an output with the same size and shape as the input arguments.*

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EA1

```
syms t r R Uinf
psi = (r-R^2/r)*Uinf*sin(t);
ur = diff((1/r)*psi,t);
ut = -diff(psi,r);

phir = int(ur,r);
phir = simplify(rewrite(phir,'sincos'));
phit = int(ut*r,t);
isAlways(phir==phit);

phi = phir;
clear phit phir

int(cos(t),t,[0,2*pi])
int(sin(t)^2,t,[0,2*pi])
int(sin(t)^2*cos(t),t)

syms Pinf rho
P = Pinf + .5*rho*Uinf^2-.5*rho*(-2*Uinf*sin(t))^2;
P2 = Pinf+.5*rho*Uinf^2*(1-4*sin(t)^2);
isAlways(P==P2)
eq = -R*cos(t)*P;
int(eq,t,[0,2*pi]);

ans =

0

ans =

pi

ans =

sin(t)^3/3

ans =

logical

1
```

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