Helicoidal Spiral

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X = helix_spiral(N,r0,h,phi0,RES,x0,y0,z0,phix,phiy,phiz,view)

Author: JCCopyrights Summer 2019 This function generates a Helicoidal circular spiral geometry to be used as a coil. The coil will be generated with center in (0,0,0) in XY plane. It can be moved using the x0,..,phix... parameters

Parameters

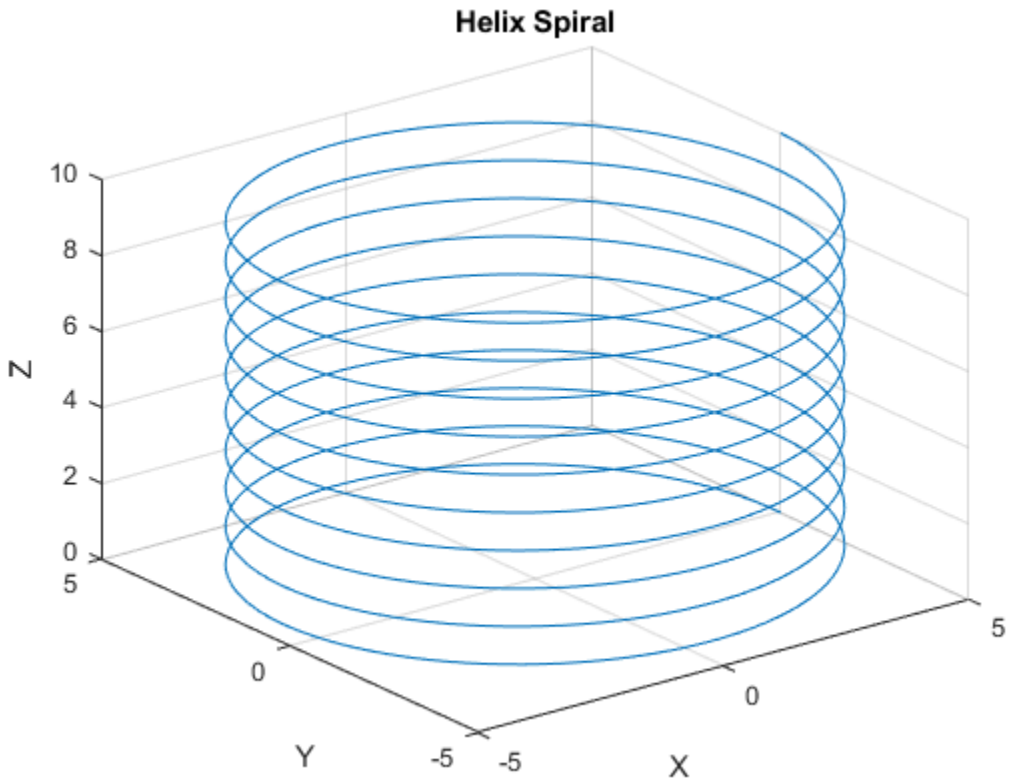
- @param **N** Number of Turns
- @param **r0** External radius of the coil
- @param **h** Height bewtween turns
- @param **phi0** Angle at which the turns start
- @param **RES** Number of nodes of the Geometry (Discretization)
- @param **x0** Center position X
- @param **y0** Center position Y
- @param **z0** Center position Z
- @param **phix** Turn respect X axis
- @param **phiy** Turn respect Y axis
- @param **phiz** Turn respect Z axis
- @param **view** Optional parameter, if true generates figure with geometry
- @retval **X** Geometry nodes

Code

```
function X =
 helix_spiral(N,r0,h,phi0,RES,x0,y0,z0,phix,phiy,phiz,view)
 Rx=[1,0,0;0,cos(phix),-sin(phix);0,sin(phix),cos(phix)];
 Ry=[cos(phiy),0,sin(phiy);0,1,0;-sin(phiy),0,cos(phiy)];
 Rz=[cos(phiz),-sin(phiz),0;sin(phiz),cos(phiz),0;0,0,1];
 omega =.010;
 t = linspace(0,2*pi*N/omega,RES);
 X=ones(3,size(t,2));
 phi = omega*t+phi0;
```

```
r = r0;
X(1,:) = r .* cos(phi);
X(2,:) = r .* sin(phi);
X(3,:)= h/(2*pi)*phi;
%The max height of the Helix is N*h
for i=1:size(t,2)
 X(:,i)=transpose(Rx*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=transpose(Ry*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=transpose(Rz*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=X(:,i)+[x0;y0;z0];
end
if nargin>11
 if view
  plot3(X(1,:),X(2,:),X(3,:))
  grid on
  xlabel('X')
  ylabel('Y')
  zlabel('Z')
  title('Helix Spiral');
 end
end
end
```

Geometry



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