Square Spiral Layer

Table of Contents

X = square_layer_spiral(N,A,L,d,layers,h,x0,y0,z0,phix,phiy,phiz,view)

This function generates a flat rectangular multilayer spiral - PCB Inductor 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

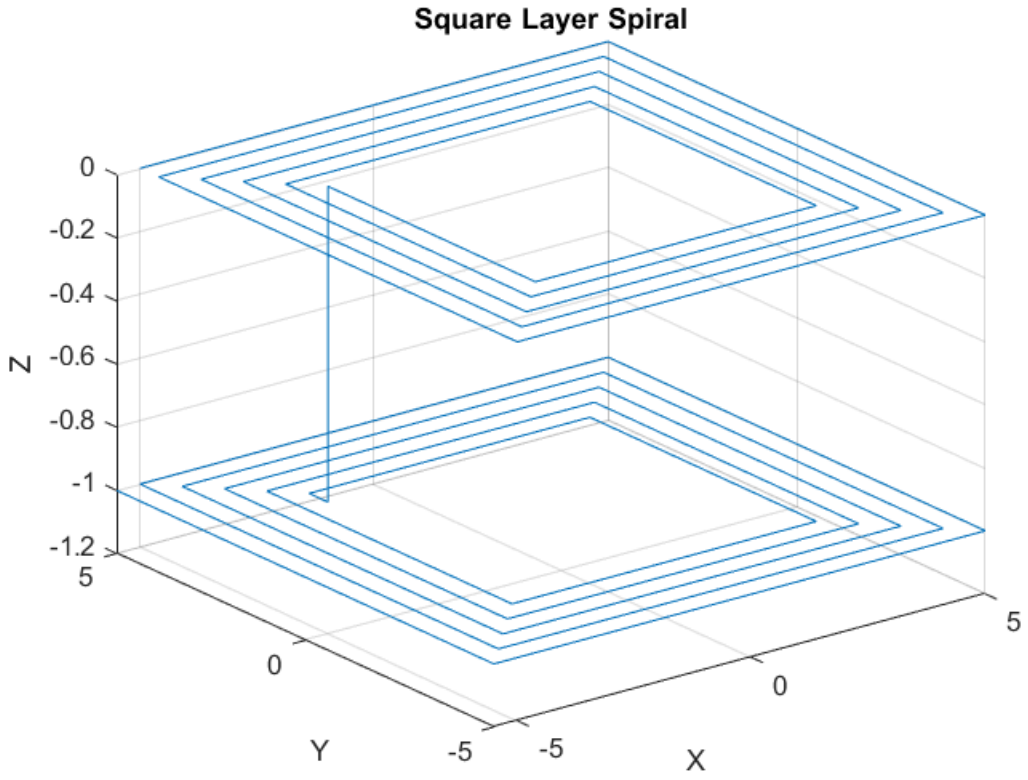
- @param **N** Number of Turns
- @param **A** Width of the coil
- @param **L** Height of the coil
- @param **d** Distane bewtween turns
- @param *layers*Number of layers of the Geometry
- @param **h** Distance between layers of the Coil
- @param **x0** Center position X
- @param **y0** Center position 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 =
 square_layer_spiral(N,A,L,d,layers,h,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];
 X=[];
 X=[X,square_spiral(N,A,L,d,0,0,0,0,0,0,false)];
 for i=2:1:layers
  if  mod(i,2)==1 %Assures the correct direction of the turns
   Xaux=X(:,size(X,2))+[0;0;-h];
```

```
    X=[X,Xaux,square_spiral(N,A,L,d,0,0,-h*(i-1),0,0,0,false)];
   else
    Xaux=fliplr(square_spiral(N,A,L,d,0,0,-h*(i-1),pi,0,0,false));
    Xaux(:,1)=X(:,size(X,2))+[0;0;-h];
    X=[X,Xaux,Xaux(:,size(Xaux,2))+[-d;0;0],Xaux(:,size(Xaux,2))+[-
d;L;0] ];
   end
  end
  for i=1:size(X,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>12
   if view
    plot3(X(1,:),X(2,:),X(3,:))
    grid on
    xlabel('X')
    ylabel('Y')
    zlabel('Z')
    title('Square Layer Spiral');
   end
  end
end
```

Geometry



Published with MATLAB® R2018b