Square Spiral Layer

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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

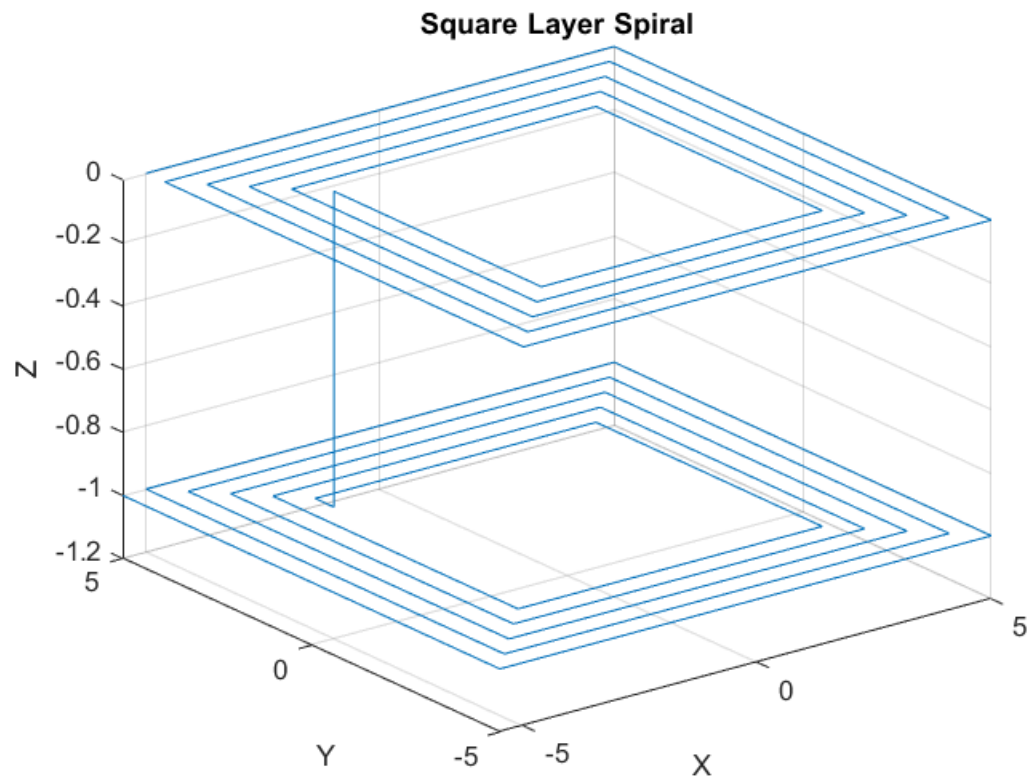- @retval **X** Geometry nodes

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];
```

```matlab
      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;A;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

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