Square Spiral

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

Author: JCCopyrights Summer 2019 This function generates a flat rectangular 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 **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_spiral(N,A,L,d,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];
 xc=-A/2;
 yc=+L/2;
 for i=1:N
  X(1,(5*i-4))=xc+(i-1)*d;
  X(2,(5*i-4))=yc-(i-1)*d;
  X(3,(5*i-4))=0;
  X(1,(5*i-3))=xc+A-(i-1)*d;
  X(2,(5*i-3))=yc-(i-1)*d;
  X(3,(5*i-3))=0;
```
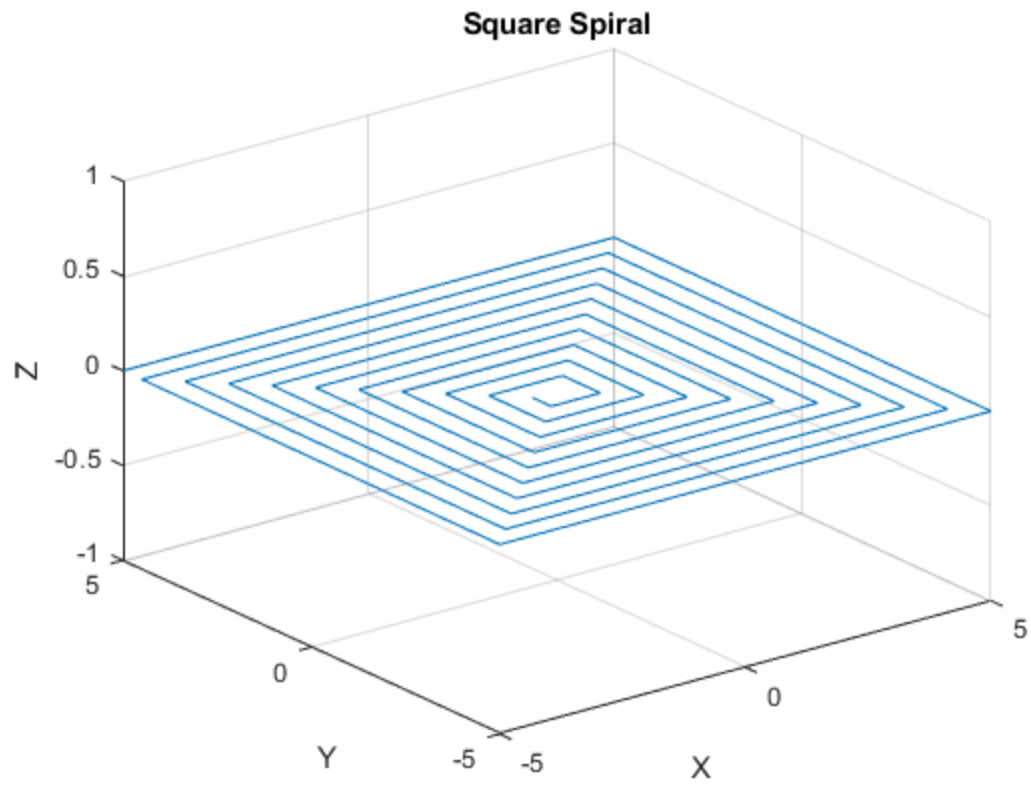
```matlab
 X(1,(5*i-2))=xc+A-(i-1)*d;
 X(2,(5*i-2))=yc-L+(i-1)*d;
 X(3,(5*i-2))=0;
 X(1,(5*i-1))=xc+(i-1)*d;
 X(2,(5*i-1))=yc-L+(i-1)*d;
 X(3,(5*i-1))=0;
 X(1,(5*i)  )=xc+(i-1)*d;
 X(2,(5*i)  )=yc-i*d;
 X(3,(5*i))=0;
end
for i=1:size(X,2)
 X(:,i)=transpose(Rx*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=transpose(Ry*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=transpose(Rz*[X(1,i);X(2,i);X(3,i)]);
 X(:,i)=X(:,i)+[x0;y0;z0];
end

 if nargin>10
  if view
   plot3(X(1,:),X(2,:),X(3,:))
   grid on
   xlabel('X')
   ylabel('Y')
   zlabel('Z')
   title('Square Spiral');
  end
 end
end
```

Geometry

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