Sonnet Community

Forums for the Sonnet Community

Matlab interface to Sonnet.

Moderator: zak

Re: VERY COOL Project.

by **alvin** » Thu Jul 24, 2008 2:39 am

> *PhasedArray wrote:*Hello Alvin! I think I know exactly what you're doing! I've wanted to do that project for a long time! Please let me know how it turns out.
>
> Correct me if I'm wrong. You want to set up a binary matrix. The matrix represents the patch antenna. One's represent copper, Zero's represent removed copper. You're want to set up an optimization algorithm that will add or remove sections of the antenna until you get the desired: bandwidth/pattern/gain/etc....
>
> Electrically connected sections will be excited, and non connected sections will behave as directors...
>
> The beauty of Sonnet is that if you have two metal pieces in contact, they do not HAVE to be merged. So let's say you have a 10 x 10 array of copper patches. Generate a template .son file that has all one hundred squares. Then, when your program writes the Sonnet project to be simulated, only include the ones that correspond to ones in the binary matrix.
>
> What I'm trying to say is that in the Sonnet project file you only need to change the GEO section. More specifically the line that begins with NUM. That defines the number of polygons.
>
> "Num 3" means you have 3 polygons.

You also have to add or remove the actual polygons.

Each polygon starts with a line that looks like

0 5 -1 N 1004 1 1 100 100 0 0 0 Y

followed by

X1, Y1
X2, Y2
X3, Y3
X4, Y4
X1, Y1
END

The X, Y's are obviously the x and y coordinates of a patch. notice it has 5 coordinates. the first and last are the same.

the first line means

0 = layer
5 = number of vertices
-1 = metal0
N = Normal meshing
1004 = the name of that polygon (should be different for each polygon)
1 = minimum cell size in x direction
1= minimum cell size in y direction
100 = max cell size in x
100 = max cell size in y
0 0 0 = just copy these
Y = Yes, turn on Edge meshing.

If you just change these lines in the .son text file, you will get what you need.

I hope this helps

Phased.

Phased,

Thank you very much! That's exactly what I want to do in my project!
Actually, I am writing a GA program to optimize the antenna. Your information are very useful and helpful!
Many Thanks!
BTW, could you suggest some books which talk about the "patch antenna design"? cause I knew that there are serval kinds of patch antenna and I still don't know what kind of the antenna mentioned above.

Alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

by **PhasedArray** » Thu Jul 24, 2008 3:49 pm

Hello again Alvin.

I've heard of this being done by others. You may want to try searching for papers on this. I think I heard Dr. Yahya Rahmat Samii of UCLA talk about this. (or his students) I think I heard it at the ACES conference in 2006 or 2007.

If the pattern devised by your Genetic Algorithm is repeating, then the antenna may be called a "fractal" antenna. Strictly speaking however, I don't think that is what you're after. What you want is an arbitrarily shaped patch. There are millions of possible shapes for planar antennas.

I would also like to suggest you try PSO (Partical Swarm Optimization) or even Ant Colony Optimization. Both may be very applicable to your approach.

For more on Ant Colony optimization search for Dr. Ozlem Kilic and her papers.

Since the shape of your antenna will be arbitrary (but symmetric) you may not be able to find much help from text books. (by the way: If you let the antenna becom asymmetric you should be able to generate circular polarization)

For general antenna books, I've always liked Thiele and Stutzman.

I hope my comments and ideas help...

Phased.

PhasedArray
Trusted Expert

Posts: 19
Joined: Mon Jul 30, 2007 2:02 pm

Top

---

by **alvin** » Mon Jul 28, 2008 5:05 am

> *zak wrote:*If you (or anyone reading this post) needs a copy of the Sonnet project file format, just email sonnet supportand we will send you a PDF.

Dear zak,

I have already sent a request to sonnet support, but it seems no response for me yet. Thx

alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

---

by **zak** » Mon Jul 28, 2008 8:52 am

We haven't received anything yet. What country are you from? You may need to wait a day or so depending on the business hours of your rep.
Zak

zak
Forum Moderator

Posts: 411
Joined: Fri Jul 01, 2005 2:42 pm
Location: Syracuse, NY
- Website

Top

---

by **alvin** » Mon Jul 28, 2008 12:29 pm

> *zak wrote:*We haven't received anything yet. What country are you from? You may need to wait a day or so depending on the business hours of your rep.

Actually, I come from Hong Kong. Maybe I try to request once again.....
thx

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

---

by **zak** » Tue Jul 29, 2008 8:30 am

We received your request and have emailed you the document. Have you received the document yet?
Zak

zak
Forum Moderator

Posts: 411
Joined: Fri Jul 01, 2005 2:42 pm
Location: Syracuse, NY
- Website

Top

---

by **alvin** » Wed Jul 30, 2008 12:57 am

Yes! I got it! Thx!

Alvin

alvin

Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

Problem about file error...

by **alvin** » Mon Aug 04, 2008 3:03 pm

Hi zak and phased,

Can you explain to me what the problem is my sonnet project file? As the program prompt me that "Line 716: Level Number must be a valid integer". However, the line 716 of the file is "END GEO". I got lost here...
Thx!

alvin

The file content is attached as followings:

```
DIM
FREQ GHZ
IND NH
LNG mm
ANG DEG
CON /OH
CAP PF
RES OH
END DIM
FREQ
SWEEP 950000000 1050000000 10000000
ABS_ENTRY 700000000 1300000000
END FREQ
CONTROL
SIMPLE
OPTIONS -d
SPEED 0
CACHE_ABS 1
TARG_ABS 300
Q_ACC N
END CONTROL
GEO
TMET "Free Space" 0 FREESPACE 376.7303136 0 0 0
BMET "Lossless" 0 SUP 0 0 0 0
MET "PatchMetal" 1 NOR 64516000 0 0.3
BOX 1 20 20 400 400 20 0
150 1 1 0 0 0 0 "Air"
3 2.2 1 0.001 0 0 0 "Substrate"
POR1 STD
POLY 10 1
0
1 50 0 0 0 10 0
NUM 187
0 5 -1 N 1 1 1 100 100 0 0 0 Y
0 0
```

```
1 0
1 1
0 1
0 0
END
0 5 -1 N 8 1 1 100 100 0 0 0 Y
7 0
8 0
8 1
7 1
7 0
END
0 5 -1 N 9 1 1 100 100 0 0 0 Y
8 0
9 0
9 1
8 1
8 0
END
0 5 -1 N 10 1 1 100 100 0 0 0 Y
9 0
10 0
10 1
9 1
9 0
END
0 5 -1 N 11 1 1 100 100 0 0 0 Y
10 0
11 0
11 1
10 1
10 0
END
0 5 -1 N 12 1 1 100 100 0 0 0 Y
11 0
12 0
12 1
11 1
11 0
END
0 5 -1 N 13 1 1 100 100 0 0 0 Y
12 0
13 0
13 1
12 1
12 0
END
0 5 -1 N 14 1 1 100 100 0 0 0 Y
13 0
14 0
14 1
13 1
13 0
END
0 5 -1 N 17 1 1 100 100 0 0 0 Y
16 0
17 0
```

```
17 1
16 1
16 0
END
0 5 -1 N 19 1 1 100 100 0 0 0 Y
18 0
19 0
19 1
18 1
18 0
END
0 5 -1 N 20 1 1 100 100 0 0 0 Y
19 0
20 0
20 1
19 1
19 0
END
0 5 -1 N 22 1 1 100 100 0 0 0 Y
1 1
2 1
2 2
1 2
1 1
END
0 5 -1 N 23 1 1 100 100 0 0 0 Y
2 1
3 1
3 2
2 2
2 1
END
0 5 -1 N 24 1 1 100 100 0 0 0 Y
3 1
4 1
4 2
3 2
3 1
END
0 5 -1 N 25 1 1 100 100 0 0 0 Y
4 1
5 1
5 2
4 2
4 1
END
0 5 -1 N 26 1 1 100 100 0 0 0 Y
5 1
6 1
6 2
5 2
5 1
END
0 5 -1 N 27 1 1 100 100 0 0 0 Y
6 1
7 1
7 2
```

```
6 2
6 1
END
0 5 -1 N 28 1 1 100 100 0 0 0 Y
7 1
8 1
8 2
7 2
7 1
END
0 5 -1 N 30 1 1 100 100 0 0 0 Y
9 1
10 1
10 2
9 2
9 1
END
0 5 -1 N 31 1 1 100 100 0 0 0 Y
10 1
11 1
11 2
10 2
10 1
END
0 5 -1 N 35 1 1 100 100 0 0 0 Y
14 1
15 1
15 2
14 2
14 1
END
0 5 -1 N 36 1 1 100 100 0 0 0 Y
15 1
16 1
16 2
15 2
15 1
END
0 5 -1 N 38 1 1 100 100 0 0 0 Y
17 1
18 1
18 2
17 2
17 1
END
0 5 -1 N 41 1 1 100 100 0 0 0 Y
0 2
1 2
1 3
0 3
0 2
END
0 5 -1 N 42 1 1 100 100 0 0 0 Y
1 2
2 2
2 3
1 3
```

```
1 2
END
0 5 -1 N 46 1 1 100 100 0 0 0 Y
5 2
6 2
6 3
5 3
5 2
END
0 5 -1 N 49 1 1 100 100 0 0 0 Y
8 2
9 2
9 3
8 3
8 2
END
0 5 -1 N 51 1 1 100 100 0 0 0 Y
10 2
11 2
11 3
10 3
10 2
END
0 5 -1 N 52 1 1 100 100 0 0 0 Y
11 2
12 2
12 3
11 3
11 2
END
0 5 -1 N 53 1 1 100 100 0 0 0 Y
12 2
13 2
13 3
12 3
12 2
END
0 5 -1 N 54 1 1 100 100 0 0 0 Y
13 2
14 2
14 3
13 3
13 2
END
0 5 -1 N 59 1 1 100 100 0 0 0 Y
18 2
19 2
19 3
18 3
18 2
END
0 5 -1 N 66 1 1 100 100 0 0 0 Y
5 3
6 3
6 4
5 4
5 3
```

```
END
0 5 -1 N 70 1 1 100 100 0 0 0 Y
9 3
10 3
10 4
9 4
9 3
END
0 5 -1 N 73 1 1 100 100 0 0 0 Y
12 3
13 3
13 4
12 4
12 3
END
0 5 -1 N 75 1 1 100 100 0 0 0 Y
14 3
15 3
15 4
14 4
14 3
END
0 5 -1 N 76 1 1 100 100 0 0 0 Y
15 3
16 3
16 4
15 4
15 3
END
0 5 -1 N 78 1 1 100 100 0 0 0 Y
17 3
18 3
18 4
17 4
17 3
END
0 5 -1 N 81 1 1 100 100 0 0 0 Y
0 4
1 4
1 5
0 5
0 4
END
0 5 -1 N 82 1 1 100 100 0 0 0 Y
1 4
2 4
2 5
1 5
1 4
END
0 5 -1 N 85 1 1 100 100 0 0 0 Y
4 4
5 4
5 5
4 5
4 4
END
```

```
0 5 -1 N 88 1 1 100 100 0 0 0 Y
7 4
8 4
8 5
7 5
7 4
END
0 5 -1 N 90 1 1 100 100 0 0 0 Y
9 4
10 4
10 5
9 5
9 4
END
0 5 -1 N 91 1 1 100 100 0 0 0 Y
10 4
11 4
11 5
10 5
10 4
END
0 5 -1 N 93 1 1 100 100 0 0 0 Y
12 4
13 4
13 5
12 5
12 4
END
0 5 -1 N 94 1 1 100 100 0 0 0 Y
13 4
14 4
14 5
13 5
13 4
END
0 5 -1 N 95 1 1 100 100 0 0 0 Y
14 4
15 4
15 5
14 5
14 4
END
0 5 -1 N 96 1 1 100 100 0 0 0 Y
15 4
16 4
16 5
15 5
15 4
END
0 5 -1 N 97 1 1 100 100 0 0 0 Y
16 4
17 4
17 5
16 5
16 4
END
0 5 -1 N 98 1 1 100 100 0 0 0 Y
```

```
17 4
18 4
18 5
17 5
17 4
END
0 5 -1 N 101 1 1 100 100 0 0 0 Y
0 5
1 5
1 6
0 6
0 5
END
0 5 -1 N 103 1 1 100 100 0 0 0 Y
2 5
3 5
3 6
2 6
2 5
END
0 5 -1 N 104 1 1 100 100 0 0 0 Y
3 5
4 5
4 6
3 6
3 5
END
0 5 -1 N 107 1 1 100 100 0 0 0 Y
6 5
7 5
7 6
6 6
6 5
END
0 5 -1 N 108 1 1 100 100 0 0 0 Y
7 5
8 5
8 6
7 6
7 5
END
0 5 -1 N 113 1 1 100 100 0 0 0 Y
12 5
13 5
13 6
12 6
12 5
END
0 5 -1 N 114 1 1 100 100 0 0 0 Y
13 5
14 5
14 6
13 6
13 5
END
0 5 -1 N 116 1 1 100 100 0 0 0 Y
15 5
```

```
16 5
16 6
15 6
15 5
END
0 5 -1 N 123 1 1 100 100 0 0 0 Y
2 6
3 6
3 7
2 7
2 6
END
0 5 -1 N 124 1 1 100 100 0 0 0 Y
3 6
4 6
4 7
3 7
3 6
END
0 5 -1 N 126 1 1 100 100 0 0 0 Y
5 6
6 6
6 7
5 7
5 6
END
0 5 -1 N 128 1 1 100 100 0 0 0 Y
7 6
8 6
8 7
7 7
7 6
END
0 5 -1 N 129 1 1 100 100 0 0 0 Y
8 6
9 6
9 7
8 7
8 6
END
0 5 -1 N 132 1 1 100 100 0 0 0 Y
11 6
12 6
12 7
11 7
11 6
END
0 5 -1 N 134 1 1 100 100 0 0 0 Y
13 6
14 6
14 7
13 7
13 6
END
0 5 -1 N 135 1 1 100 100 0 0 0 Y
14 6
15 6
```

```
15 7
14 7
14 6
END
0 5 -1 N 136 1 1 100 100 0 0 0 Y
15 6
16 6
16 7
15 7
15 6
END
0 5 -1 N 137 1 1 100 100 0 0 0 Y
16 6
17 6
17 7
16 7
16 6
END
0 5 -1 N 138 1 1 100 100 0 0 0 Y
17 6
18 6
18 7
17 7
17 6
END
0 5 -1 N 139 1 1 100 100 0 0 0 Y
18 6
19 6
19 7
18 7
18 6
END
0 5 -1 N 141 1 1 100 100 0 0 0 Y
0 7
1 7
1 8
0 8
0 7
END
0 5 -1 N 143 1 1 100 100 0 0 0 Y
2 7
3 7
3 8
2 8
2 7
END
0 5 -1 N 144 1 1 100 100 0 0 0 Y
3 7
4 7
4 8
3 8
3 7
END
0 5 -1 N 145 1 1 100 100 0 0 0 Y
4 7
5 7
5 8
```

```
4 8
4 7
END
0 5 -1 N 146 1 1 100 100 0 0 0 Y
5 7
6 7
6 8
5 8
5 7
END
0 5 -1 N 147 1 1 100 100 0 0 0 Y
6 7
7 7
7 8
6 8
6 7
END
0 5 -1 N 152 1 1 100 100 0 0 0 Y
11 7
12 7
12 8
11 8
11 7
END
0 5 -1 N 154 1 1 100 100 0 0 0 Y
13 7
14 7
14 8
13 8
13 7
END
0 5 -1 N 155 1 1 100 100 0 0 0 Y
14 7
15 7
15 8
14 8
14 7
END
0 5 -1 N 156 1 1 100 100 0 0 0 Y
15 7
16 7
16 8
15 8
15 7
END
0 5 -1 N 159 1 1 100 100 0 0 0 Y
18 7
19 7
19 8
18 8
18 7
END
0 5 -1 N 163 1 1 100 100 0 0 0 Y
2 8
3 8
3 9
2 9
```

```
2 8
END
0 5 -1 N 165 1 1 100 100 0 0 0 Y
4 8
5 8
5 9
4 9
4 8
END
0 5 -1 N 167 1 1 100 100 0 0 0 Y
6 8
7 8
7 9
6 9
6 8
END
0 5 -1 N 168 1 1 100 100 0 0 0 Y
7 8
8 8
8 9
7 9
7 8
END
0 5 -1 N 171 1 1 100 100 0 0 0 Y
10 8
11 8
11 9
10 9
10 8
END
0 5 -1 N 173 1 1 100 100 0 0 0 Y
12 8
13 8
13 9
12 9
12 8
END
0 5 -1 N 174 1 1 100 100 0 0 0 Y
13 8
14 8
14 9
13 9
13 8
END
0 5 -1 N 177 1 1 100 100 0 0 0 Y
16 8
17 8
17 9
16 9
16 8
END
0 5 -1 N 178 1 1 100 100 0 0 0 Y
17 8
18 8
18 9
17 9
17 8
```

```
END
0 5 -1 N 179 1 1 100 100 0 0 0 Y
18 8
19 8
19 9
18 9
18 8
END
0 5 -1 N 180 1 1 100 100 0 0 0 Y
19 8
20 8
20 9
19 9
19 8
END
0 5 -1 N 182 1 1 100 100 0 0 0 Y
1 9
2 9
2 10
1 10
1 9
END
0 5 -1 N 183 1 1 100 100 0 0 0 Y
2 9
3 9
3 10
2 10
2 9
END
0 5 -1 N 184 1 1 100 100 0 0 0 Y
3 9
4 9
4 10
3 10
3 9
END
0 5 -1 N 185 1 1 100 100 0 0 0 Y
4 9
5 9
5 10
4 10
4 9
END
END GEO
OPT
MAX 100
VARS
END OPT
VARSWP
END VARSWP
FILEOUT
TS D Y $BASENAME.s1p IC 8 S MA R VARIABLE18
TS D Y $BASENAME_1.s1p IC 8 Z RI R VARIABLE19
TS D Y $BASENAME_2.s1p IC 8 Y RI R VARIABLE20
END FILEOUT
QSG
IMPORT NO
```

EXTRA_METAL NO
UNITS YES
ALIGN NO
REF NO
VIEW_RES NO
METALS YES
USED YES
Last edited by alvin on Tue Aug 05, 2008 1:29 am, edited 1 time in total.

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

---

by **PhasedArray** » Mon Aug 04, 2008 3:56 pm

POLY 10 1 <= means port is attached to polygon 10
0 <= means a via port will be used
1 50 0 0 0 10 0 <= port number 1, 50 Ohms
NUM 187 <= 187 polygons
0 5 -1 N 1 1 1 100 100 0 0 0 Y <= Polygon name is 1 (the 5th word).

Two possible problems:

1) you may not be able to start naming polygons from 1. Start with 1001 for example.

2) You say a via port will be used but I don't think there are any vias in your file. you have to draw a small via inside one of the polygons. the via will also be a polygon. but it will be called a VIA POLYGON.

These may help. When I was writing my antenna program, Zak helped me a lot. He always suggested that after I write the .son file I should open it up in Sonnet to see if everything looked correct. So if you don't have a via polygon, your circuit doesn't have a port. That could cause an error. (I didn't check all 187, so I didn't see a via...).

Good luck,

Phased.

PhasedArray
Trusted Expert

Posts: 19
Joined: Mon Jul 30, 2007 2:02 pm

Top

---

by **alvin** » Mon Aug 04, 2008 5:13 pm

> *PhasedArray wrote:*POLY 10 1 <= means port is attached to polygon 10
> 0 <= means a via port will be used
> 1 50 0 0 0 10 0 <= port number 1, 50 Ohms
> NUM 187 <= 187 polygons
> 0 5 -1 N 1 1 1 100 100 0 0 0 Y <= Polygon name is 1 (the 5th word).

Two possible problems:

1) you may not be able to start naming polygons from 1. Start with 1001 for example.

2) You say a via port will be used but I don't think there are any vias in your file. you have to draw a small via inside one of the polygons. the via will also be a polygon. but it will be called a VIA POLYGON.

These may help. When I was writing my antenna program, Zak helped me a lot. He always suggested that after I write the .son file I should open it up in Sonnet to see if everything looked correct. So if you don't have a via polygon, your circuit doesn't have a port. That could cause an error. (I didn't check all 187, so I didn't see a via...).

Good luck,

Phased.

Thank you Phased!
Actually, this design is using edge feed, so you cannot find any via polygon here. Perphaps, I have to try out your suggestion first.

alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

---

by **zak** » Tue Aug 05, 2008 12:53 pm

*PhasedArray wrote:*POLY 10 1 <= means port is attached to polygon 10
0 <= means a via port will be used
1 50 0 0 0 10 0 <= port number 1, 50 Ohms
NUM 187 <= 187 polygons
0 5 -1 N 1 1 1 100 100 0 0 0 Y <= Polygon name is 1 (the 5th word).

Actually, the "0" means that the port is attached to edge 0 (Sonnet starts numbering edges at zero), so, a correction to what Phased says goes like this:

Code: Select all

```
POLY 10 1   <= means port is attached to polygon 10
0               <= means it's attached to edge 0
1 50 0 0 0 10 0 <= port number 1, 50 Ohms
NUM 187          <= 187 polygons
0 5 -1 N 1 1 1 100 100 0 0 0 Y  <= Polygon name is 1 (the 5th word).
```

Notice, "NUM 187" says there are 187 polygons, but I only see 96 polygons in your file. So, you should change the "NUM 187" to "NUM 96".

A couple of other points:

1) Your file starts with "DIM", but if you look at a sample file from Sonnet, there is a lot more header stuff. The first line of the file should start with "FTYP". If you don't put the header info in, bad things can happen... like it might load into xgeom but might not run in em.

2) PhasedArray is right when he says you should start numbering your polygons at 1001. Sonnet has a few reserved numbers (maybe as few as 10, but good to be safe and use 1000).
Zak

zak
Forum Moderator

Posts: 411
Joined: Fri Jul 01, 2005 2:42 pm
Location: Syracuse, NY
- Website

Top

---

by **alvin** » Wed Aug 06, 2008 11:19 am

Thanks to zak and phased! The problem is solved.

alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

Question about the program

by **alvin** » Sat Aug 09, 2008 2:11 pm

Dear zak and phased,

I have some question about the program with a topic "Probe Fed Rectangular Patch Antenna Designer Using Matlab".

In the Matlab program "PrepPatchVars.m", How does the parameter(7) affect the performance of the antenna? Can I set it to zero?

Thanks!

alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

by **PhasedArray** » Mon Aug 11, 2008 11:52 am

Hello Alvin,

Parameter(7) corresponds to VARIABLE07 in the PatchTemplate.son file.

This is the height of the air layer above the antenna. So you should not set it to zero.

Phased.

PhasedArray
Trusted Expert

Posts: 19
Joined: Mon Jul 30, 2007 2:02 pm

Top

by **alvin** » Mon Aug 11, 2008 12:55 pm

> *PhasedArray wrote:*Hello Alvin,
>
> Parameter(7) corresponds to VARIABLE07 in the PatchTemplate.son file.
>
> This is the height of the air layer above the antenna. So you should not set it to zero.
>
> Phased.

Hi! Phased,

As I saw that the height of the air layer is quit large, what should I do for this while making prototype?

on the other hand, I am setting a fitness equation for my GA optimization. Does the equation must me calculated in Probability? Thanks

alvin

alvin
Member

Posts: 22
Joined: Tue Jan 22, 2008 12:41 am

Top

Previous Next Display posts from previous: All posts Sort by Post time Ascending Go

Post a reply
47 posts • Page **2** of **4** • 1, **2**, 3, 4

Return to Sonnet Release 11 and Before

Jump to: Sonnet Release 11 and Before Go

Who is online

Users browsing this forum: No registered users and 1 guest

- Board index
- The team • Delete all board cookies • All times are UTC - 5 hours [DST]