

Designing Microstrip Patch Antenna in Matlab

Code:

```
%dielectric constant of substrate
er = 4.2

%resonant frequency in Hz
f = 2.4e9

%height of substrate in mm
h = 1.57

%free space velocity of light (multiplied by 1000 to convert m to mm)
v0 = (3e8) * (1e3)

width = (v0 / (2 * f)) * sqrt( (2 / (er + 1)) )

%calculating effective dielectric constant
eff = ((er + 1)/2) + ((er - 1) / (2 * sqrt(1 + (12*(h/width))))))

%calculating delta L
delta_l = h * (0.412 (((eff+0.3) * ((width/h) + 0.264))/(( eff+0.3) * ((width/h) + 0.264))))

%calculating L
length = (v0 / (2 * f * sqrt (eff))) - (2 * delta_l)

%Finally the effective length
eff_l = length + (2 * delta_l)
```

Output:

```
$octave -qf --no-window-system demo.m

er = 4.2000
f = 2.4000e+09
h = 1.5700
v0 = 3.0000e+11
width = 38.761
eff = 3.9125
delta_l = 0.64684
length = 30.304
eff_l = 31.597
```

Screenshot



The screenshot shows a MATLAB script execution window with two panes. The left pane displays the script code, and the right pane shows the execution results.

Script Code (Left Pane):

```
1 %dielectric constant of substrate
2 er = 4.2
3
4 %resonant frequency in Hz
5 f = 2.4e9
6
7 %height of substrate in mm
8 h = 1.57
9
10 %free space velocity of light (multiplied by 1000 to convert m to mm)
11 v0 = (3e8) * (1e3)
12
13 width = (v0 / (2 * f)) * sqrt(2 / (er + 1))
14
15 %calculating effective dielectric constant
16 eff = ((er + 1)/2) + ((er - 1) / (2 * sqrt(1 + (12*(h/width))))))
17
18 %calculating delta l
19 delta_l = h * (0.412 (((eff+0.3) * ((width/h) + 0.264))/((eff+0.3) * ((width/h) + 0.264))))
20
21 %calculating l
22 length = (v0 / (2 * f * sqrt(eff))) - (2 * delta_l)
23
24 %Finally the effective length
25 eff_l = length + (2 * delta_l)
```

Execution Results (Right Pane):

```
soctave -qf --no-window-system demo.m
er = 4.2000
f = 2.4000e+09
h = 1.5700
v0 = 3.0000e+11
width = 38.761
eff = 3.9125
delta_l = 0.64684
length = 30.304
eff_l = 31.597
warning: function ./demo.m shadows a core library function
```