EXPT No.6 **Date:23/03/2021**

Rajus Nagwekar

60002180080

TE EXTC 2

Aim: To design equilateral triangular microstrip antenna at given frequency using MATLAB and analyse using antenna simulation software

Apparatus: MATLAB, Antenna simulation software

Theory:

A microstrip patch antenna is a metallic strip or patch mounted on a dielectric layer (substrate) over a ground plane. Useful for high performance in extreme applications: aircraft, satellite, missiles, cell phones and electronic devices.

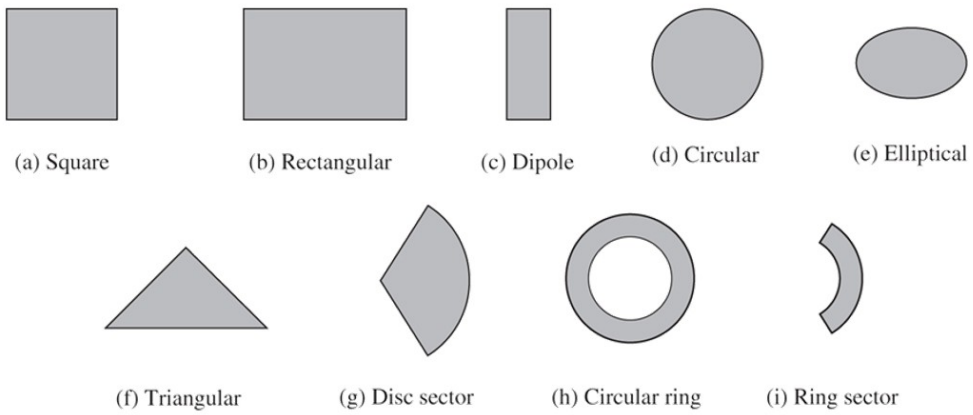

Fig. 1 Shapes of MSAs

ETMSA Operating In Its Fundamental Mode:

For the fundamental TM_{10} mode of the ETMSA, the magnitude of voltage variation along the periphery is shown as positive and negative, and the vector representation of the field variation is shown in figure below. More the number of positive or negative, or a larger arrow size are used to show that the magnitude is large.

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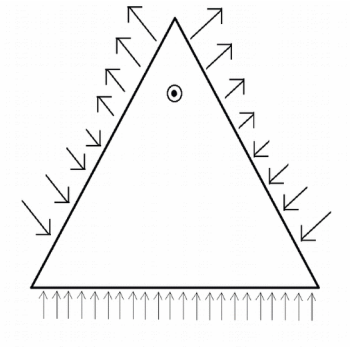
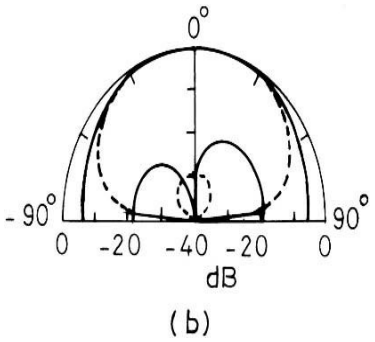
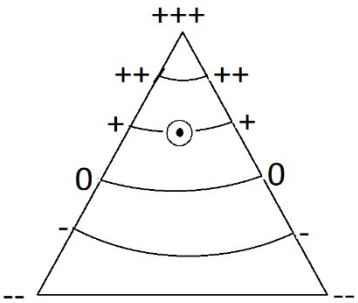




(b)



Equations:

$$f_{mnl} = f_{mn} = \frac{2c(m^2 + mn + n^2)^{1/2}}{3S_e\sqrt{\epsilon_e}}$$

$$S_e = S + \frac{4h}{\sqrt{\epsilon_e}}$$

Code:

```
clc;
clear all;
close all;
c=30;
m=0;
n=1;
h=input('Enter Height in cm:');
er=input('Enter Dielectric Constant:');
f=input('Enter Frequency in GHz:');
Se=(2*c)*(sqrt((m*m)+(m*n)+(n*n)))/(3*f*sqrt(er));
Se
S=Se-(4*h/sqrt(er));
S
```

Output:

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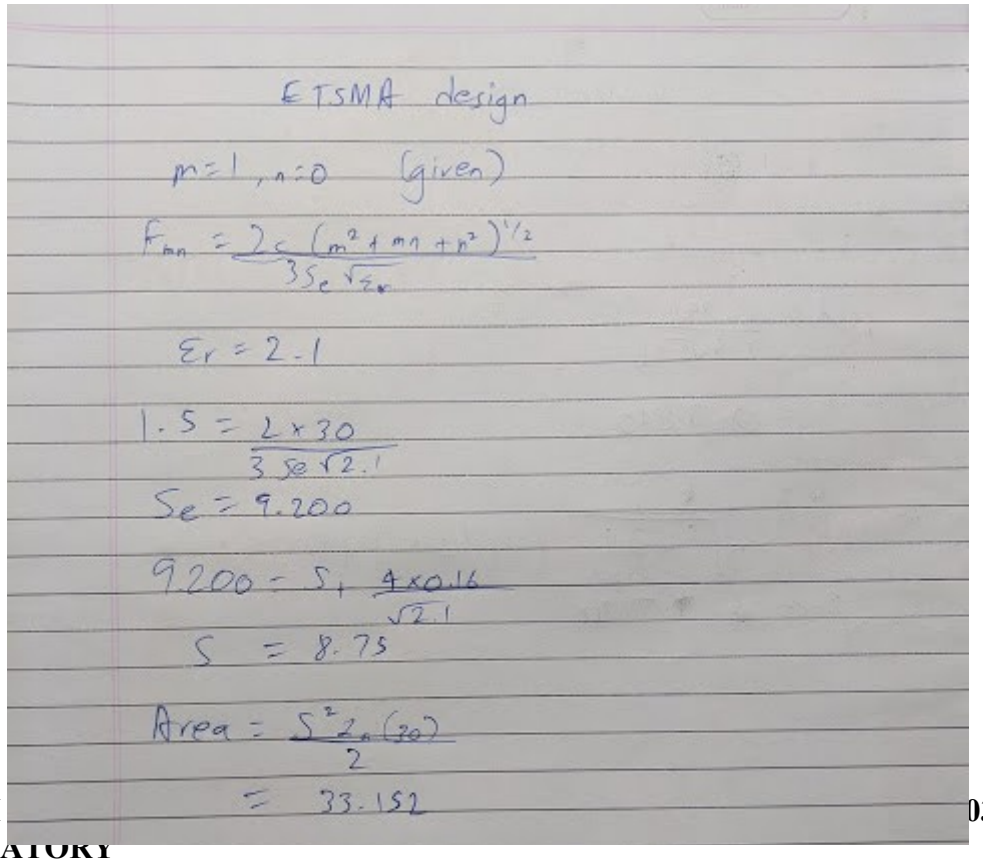
```
Enter Height in cm:0.16
Enter Dielectric Constant:2.1
Enter Frequency in GHz:1.5
Se = 9.2009
S = 8.7592
>>
```

Observation:

εr	h(cm)	f(GHz)	S(cm)
2.1	0.16	1.5	8.75

Calculation:



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Conclusion:

Therefore, we have successfully designed and analysed design equilateral triangular microstrip antenna at a given frequency.