

```
% ENE323 Microstrip Patch Antenna Design /Matlab  
% 65070502406 Kittiphop Phanthachart
```

```
clear all;  
clc;
```

```
% Input Parameter
```

```
er = 4.3 ; %input('Relative Permittivity(er): ');  
lt = 0.025 ; %input('Dielectric loss tangent(lt): ');  
h = 0.8 ; %input('Thickness(h[mm]): ');  
fr = 7 ; %input('Resonant Frequency(fr[GHz]): ');
```

```
% The Constant
```

```
c = 299792458; % Speed of light
```

```
% Unit Transformation
```

```
h = h*1e-3; % to mm  
fr= fr*1e9; % to GHz
```

```
% Calculation
```

```
wp = (c/(2*fr))*(sqrt((2)/(er+1)))
```

```
e_eff = ((er+1)/2)+((er-1)/(2*sqrt(1+(12*(h/wp)))))
```

```
delta_L = (h*0.412*(e_eff+0.3)*((wp/h)+0.264))/((e_eff-0.258)*((wp/h)+0.813))
```

```
lp = (c/(2*fr*sqrt(e_eff)))-(2*delta_L)
```

```
wg = wp + (6*h)
```

```
lg = lp + (6*h)
```

```
G1 = (1/120)*(wp/(c/fr))
```

```
y0 = acos(sqrt(50*2*G1))*(lp/pi)
```