Plot polar radiation patterns for the *U* of 2.4b (both unitless and in dB w/ 0 to -20 dB scale) in the elevation planes coinciding with the *x-z* plane (i.e., wrt θ when ϕ = 0 & 180°). Attach copy of all work done (e.g., copy of command window, m-file, …)

b) Elevation Pattern- Plot $U(\theta) = \cos^2(\theta)$ versus θ (0 to 90°) with ϕ = 0° & 180°

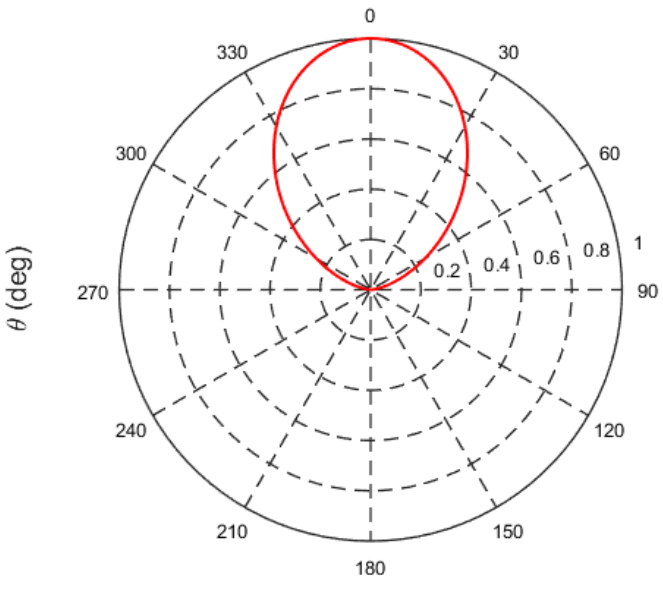
m-file

```
% EE 483 problem 2.4(b)(p2_04b_elevation.m)
% Plot elevation pattern (wrt theta) for
% U = cos^2(theta)   0 <= theta <= 90 deg
clear;clc;close all;
theta = -pi/2 : pi/180 : pi/2; % vary elev. angle for symmetric plot
U = cos(theta).*cos(theta);
% ******* Plot U in dB format *******
radpat(theta*180/pi,abs(U),'r-')
% ******* Plot U in dimensionless format *******
figure; polar(theta,abs(U),'r-'); view([90 -90]); % rotate 90 deg
xlabel('\theta (deg)','fontsize',14,'fontname','times roman'),
set(findobj('type','line'),'linewidth',1.5)
set(findobj('type','line'),'markersize',14)  % change size of markers
set(findobj('type','axes'),'linewidth',2)
```

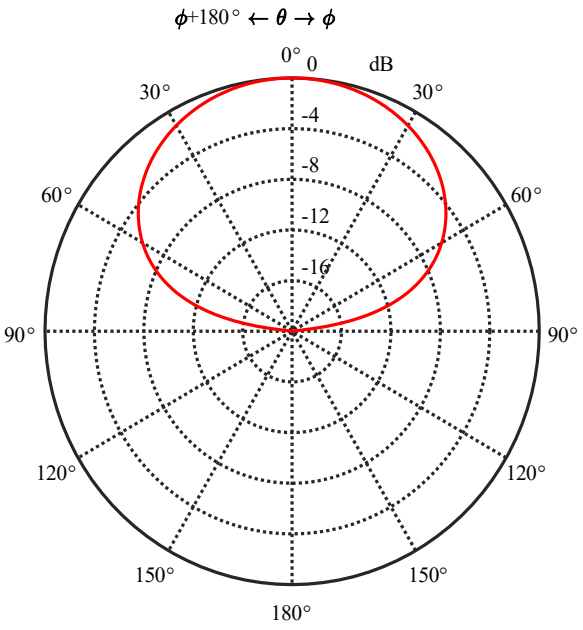
Command Window

```
Are input values in dB (Y/N)[Y]? N
Input values proportional to power (Y/N) [Y]? Y
Normalize to the Maximum Gain Value (Y/N)[Y]? Y
Minimum dB value at plot center [-40]? -20
Are the angles theta values? (Y/N)[Y]? Y
Labels on Vertical or Horizontal axis (V/H)[V]? H
Pattern line width [1.25]: 2
Line type of grid(-, --, -., :)[:]? --
```

Unitless plot



dB plot



Plot polar radiation patterns for the U of 2.4d (both unitless and in dB w/ 0 to -20 dB scale) in the elevation planes coinciding with the x-z plane (i.e., wrt θ when ϕ = 0 & 180°). Attach copy of all work done (e.g., copy of command window, m-file, …)

d) Elevation Pattern- Plot $U(\theta) = \cos^2(2\theta)$ versus θ (0 to 90°) with ϕ = 0° & 180°

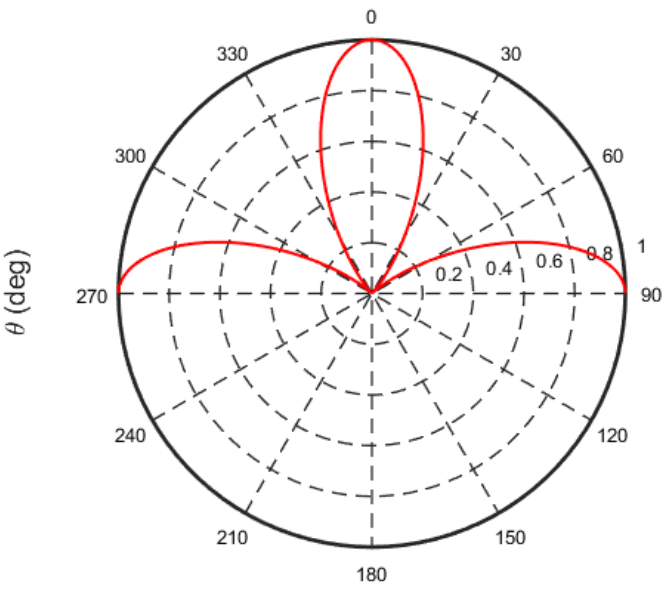
m-file

```
% EE 483 problem 2.4(d)(p2_04d_elevation.m)
% Plot elevation pattern (wrt theta) for
% U = cos^2(2*theta)   0 <= theta <= 90 deg
clear;clc;close all;
theta = -pi/2 : pi/180 : pi/2;  % vary elev. angle for symmetric plot
U = cos(2*theta).*cos(2*theta);
% ******* Plot U in dB format *******
radpat(theta*180/pi,abs(U),'r-')
% ******* Plot U in dimensionless format *******
figure; polar(theta,abs(U),'r-'); view([90 -90]); %rotate 90 deg
xlabel('\theta (deg)','fontsize',14,'fontname','times roman'),
set(findobj('type','line'),'linewidth',1.5)
set(findobj('type','line'),'markersize',14)  % change size of markers
set(findobj('type','axes'),'linewidth',2)
```

Command Window

```
Are input values in dB (Y/N)[Y]? N
Input values proportional to power (Y/N) [Y]? Y
Normalize to the Maximum Gain Value (Y/N)[Y]? Y
Minimum dB value at plot center [-40]? -20
Are the angles theta values? (Y/N)[Y]? Y
Labels on Vertical or Horizontal axis (V/H)[V]? H
Pattern line width [1.25]: 2
Line type of grid(-, --, -., :)[:]? --
```

Unitless plot



dB plot