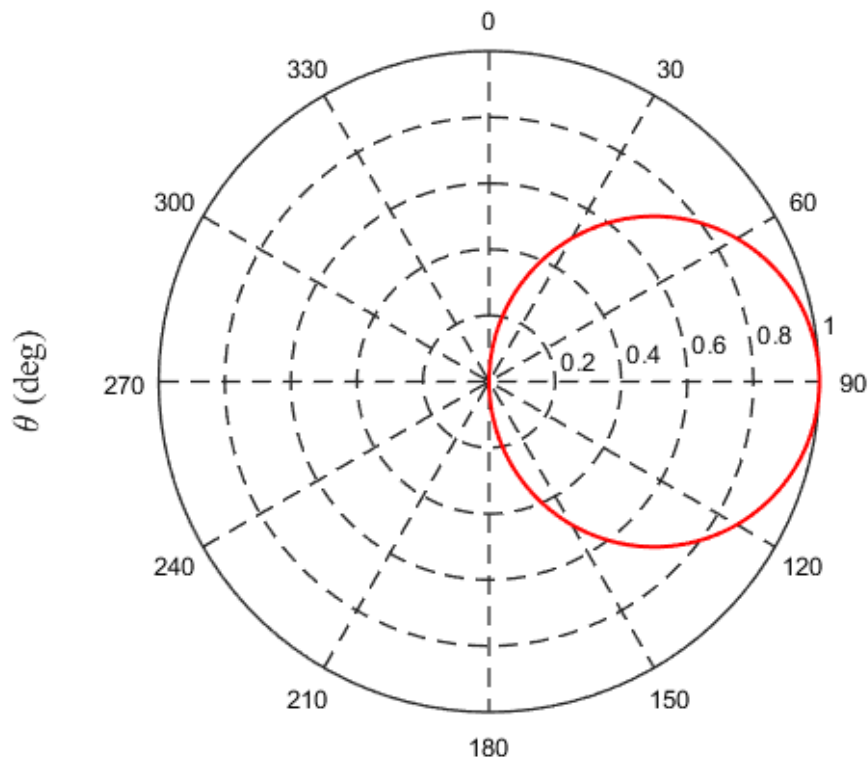


Plot polar radiation patterns for  $U$  of 2.12(c) (both unitless and in dB w/ 0 to -20 dB scale) in the elevation planes coinciding with the  $y$ - $z$  plane (i.e., wrt  $\theta$  when  $\phi = 90^\circ$ ) and the azimuthal plane (i.e., wrt  $\phi$  when  $\theta = 90^\circ$ ). Attach copy of all work done (e.g., copy of command window, m-file, ...)

**Elevation Pattern- Plot  $U(\theta, \phi) = \sin(\theta) \sin^3(\phi)$  vs  $\theta$  w/  $\phi = 90^\circ$  ( $0 \leq \theta \leq \pi$ )**

```
% EE 483/583 problem 2.12(c) (p2_12c_elevation.m)
% Plot elevation pattern (wrt theta) for
% U = sin(theta)*sin^3(phi); 0 < phi & theta < pi
clear; clc; close all;
phi = pi/2; % fixed phi angle (also works for 1.5pi)
theta = 0 : pi/180 : pi; % elevation angles for elevation pattern
U = sin(theta).*sin(phi).*sin(phi).*sin(phi);
% ***** 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'),
set(findobj('type','line'),'linewidth',1.5)
set(findobj('type','axes'),'linewidth',2)
```



**Elevation Patterns cont.**

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

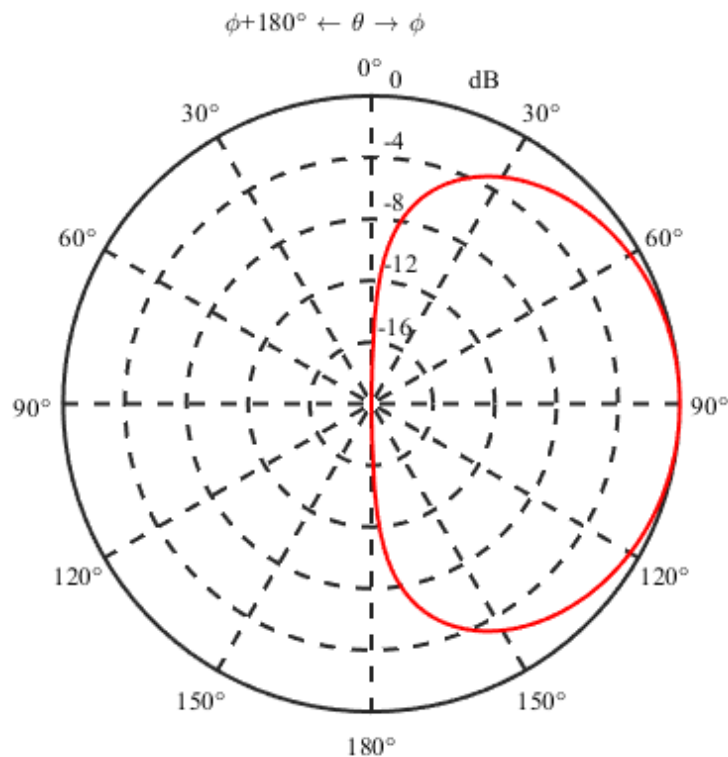
Minimum dB value at plot center [-40]? -20

Are the angles theta values? (Y/N)[Y]? Y

Labels on Vertical or Horizontal axis (V/H)[V]? V

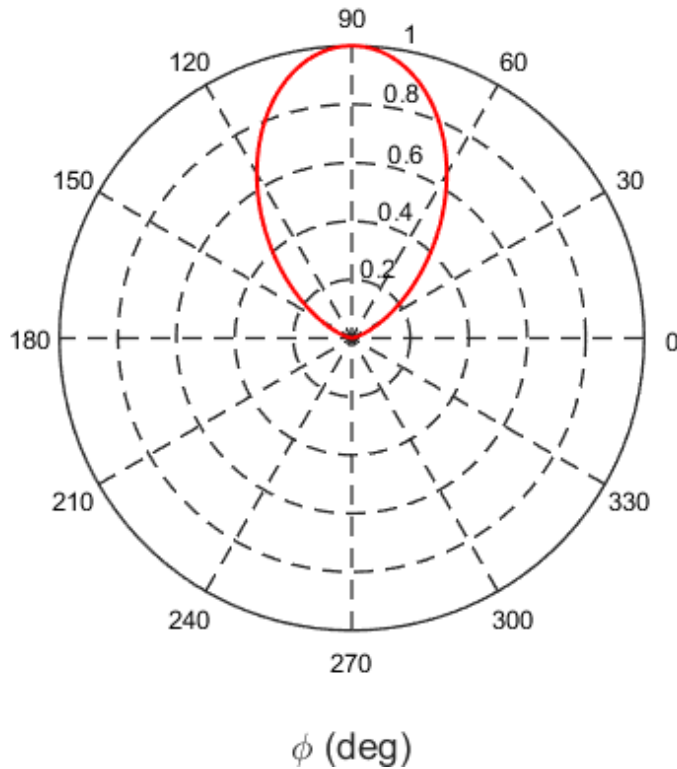
Pattern line width [1.25]: 2

Line type of grid(-, --, -, :)[:]? --

**Azimuthal Pattern- Plot  $U = \sin(\theta) \sin^3(\phi)$  versus  $\phi$  with  $\theta = \pi/2 = 90^\circ$** 

```
% EE 483/583 problem 2.12(c) (p2_12c_azimuthal.m)
% Plot azimuthal pattern (wrt phi) for
% U = sin(theta)*sin^3(phi); 0 < phi & theta < pi
%
clear; clc; close all;
theta = pi/2;           % fixed theta angle
phi = 0 : pi/180 : pi; % vary azimuthal angle
U = sin(theta).*sin(phi).*sin(phi).*sin(phi);
% ***** Plot U in dB format *****
radpat(phi*180/pi,abs(U),'r-')
% ***** Plot U in dimensionless format *****
figure; polar(phi,abs(U),'r-');
xlabel('\phi (deg)','fontsize',14,'fontname','times roman'),
set(findobj('type','line'),'linewidth',1.5)
set(findobj('type','axes'),'linewidth',2)
```

**Azimuthal Patterns cont.**



- 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]? N
- 0 deg at North/Top or East/Right (N/E)[N]? E
- Labels on Vertical or Horizontal axis (V/H)[V]? V
- Pattern line width [1.25]: 2
- Line type of grid(-, --, -, :)[:]: --

