EECE 588 Spring 2019 Homework 1

Due: 3/12/19 in Class (2:00 pm)

EE 20182737

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**1.**

a.



b.



c.

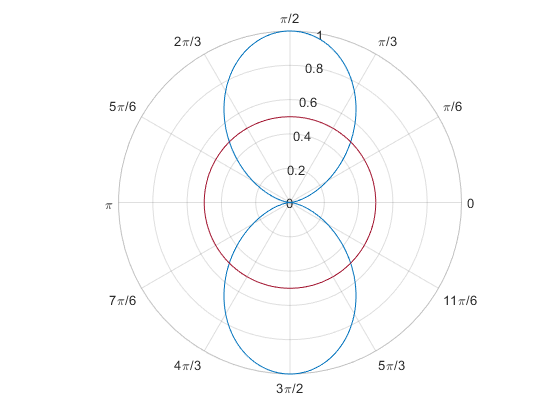


d.



**2.**

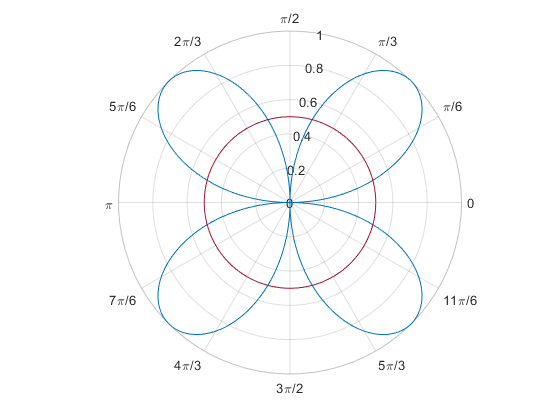
a.



Beamwidth = 2.36-0.79 = 1.57 (rad)

= 90°

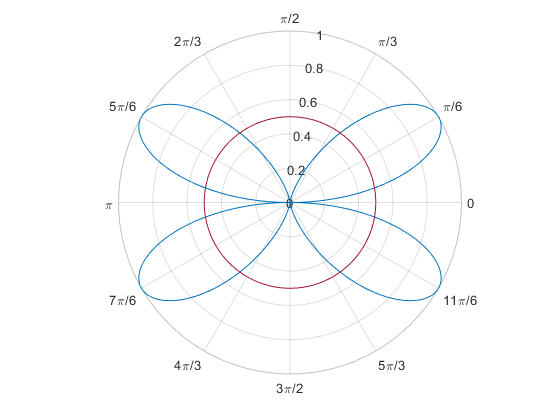
b.



Beamwidth = 1.31-0.26 = 1.05 (rad)

= 60.2°

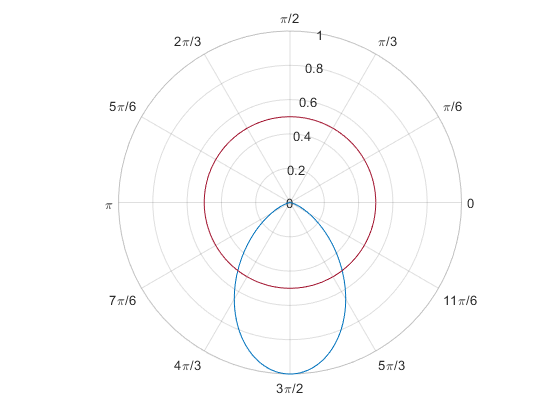
c.



Beamwidth = 0.95-0.17 = 0.78 (rad)

= 44.7°

d.



Beamwidth = 5.36-4.05 = 1.31 (rad)

= 75.1°

**3.**

a.

Consider for configure right- or left- hand

-> **Left-hand circular polarization**

b.

-> **linear polarization**

c.

Consider for configure right- or left- hand

-> **Right-hand circular polarization**

d.

Consider for configure right- or left- hand

-> **Left-hand circular polarization**

**4.**

Communication system at 10 GHz

One major lobe, ideally no minor lobes or can be neglected.

The pattern symmetry to the azimuthal.

Half-power beamwidth of 10 degrees.

Exists only the upper hemisphere.

SOLVE:

a.

From the problem, . Therefore

b.

5.

A communications satellite stable altitude = 22370 miles=36001 km = 3.6e+7 m

Transmits with 8.0 W of power

The receiving antenna is a 210 ft.

Assume the transmitter antenna is isotropic. -> Directivity=1

The both antennas are impedance matched, resistive losses are negligible.

Mismatch polarization: 8-degree tilt between the 2 antennas.

\*From the book, at a frequency 2 GHz -> 0.15 m

SOLVE:

a.

b. Use the Friis transmission formula (eq. 2-117)