Ingenieurbüro Baumann --- www.leobaumann.de --- 46282 Dorsten, Markt 6
manuelle Berechnung eines horizontalen Bi-Quads mit Reflektor in einer Höhe b2 über Grund
h = Länge, d = Distanz, d1 = Distanz 2. Element, d2 = Distanz Reflektor, b2 = Höhe über Grund, l = Wellenlänge

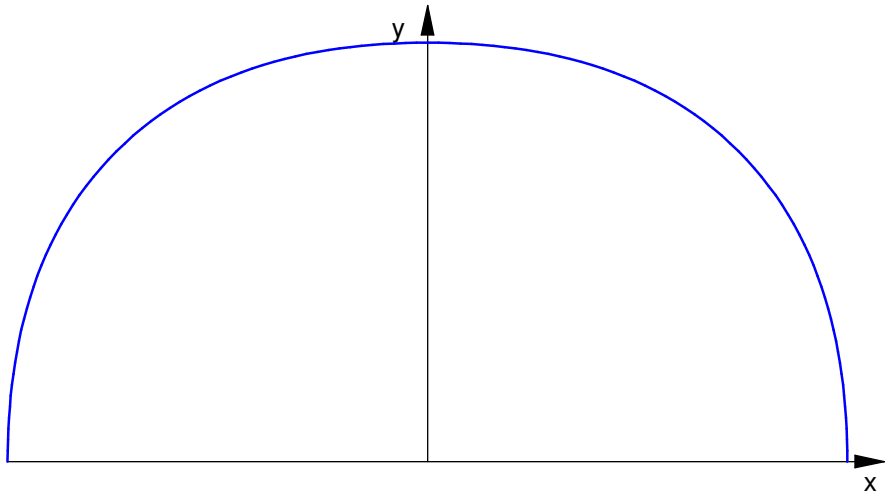
```
reset():digits:=16:wh:=45*PI/180:k:=1/1000:wv:=51.59*PI/180:w:=90*PI
/180:h:=1/4:d:=h:b2:=1/1.999999:l:=1:d1:=1/4:
```

Richtdiagramm im Kugelraum als Funktion der Winkel

```
c:=(the,phi1) -> (abs((cos(PI*h/l*cos(the)*sin(phi1))-
cos(PI*h/l)))/(sqrt(1-cos(the)^2*sin(phi1)^2))
                  *2*abs(cos(PI*d/l*sin(phi1)*sin(the)))
                  *2*abs(sin(PI*d1/l*sin(phi1)*cos(phi1)))
                  +abs((cos(PI*h/l*cos(the-w)*sin(phi1))-
  cos(PI*h/l))/(sqrt(1-cos(the-w)^2*sin(phi1)^2)))
                  *2*abs(cos(PI*d/l*sin(phi1)*sin(the-w)))
                  *2*abs(sin(PI*d1/l*sin(phi1)*cos(phi1))))
                  *2*abs(sin(PI*2*b2/l*cos(phi1))):
```

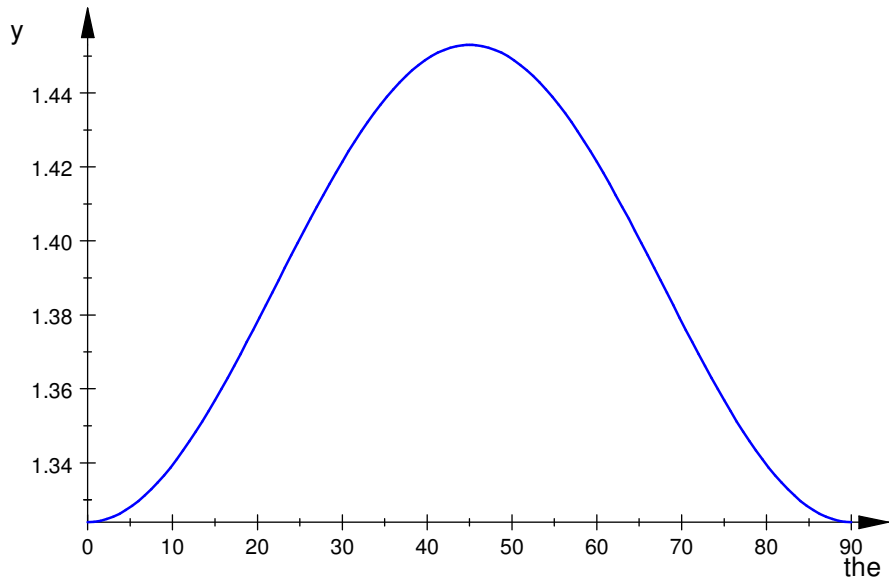
Horizontaldiagramm

```
plot(plot::Polar([c(the,wv),the], the = 0..PI, TicksNumber=None,
Scaling=Constrained));
```




horizontale relative Strahlungsleistungsdichte

```
plotfunc2d(c(the*PI/180,wv)^2, the = 0..90):
```




Maximalwert der relativen Stahlungsleistungsdichte , auch in dBi

```
ghmax:=0:ghwmax:=0:for m from 0 to 2879 step 1 do
gh:=float(c(m*PI/5760,wv)^2);
if gh>ghmax then
     ghmax:=gh;
     ghwmax:=float(m/32);
end_if;
end_for:ghmax;float(10*ln(ghmax)/ln(10)+2.15);ghwmax;
```

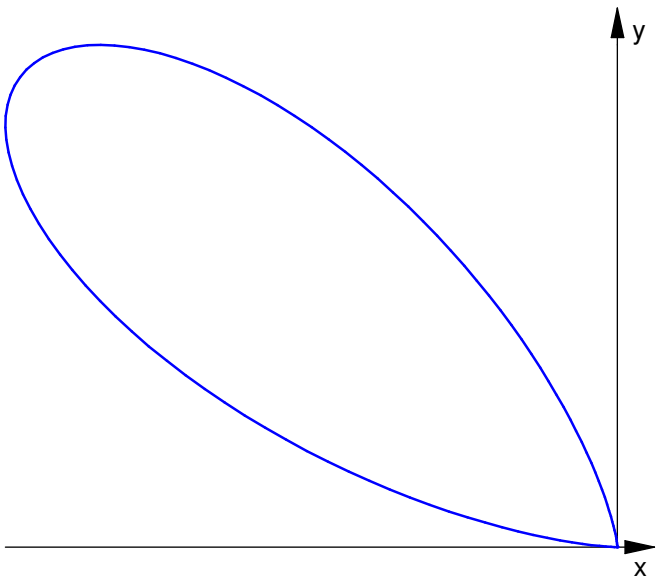
1.453017384

3.772708104

45.0

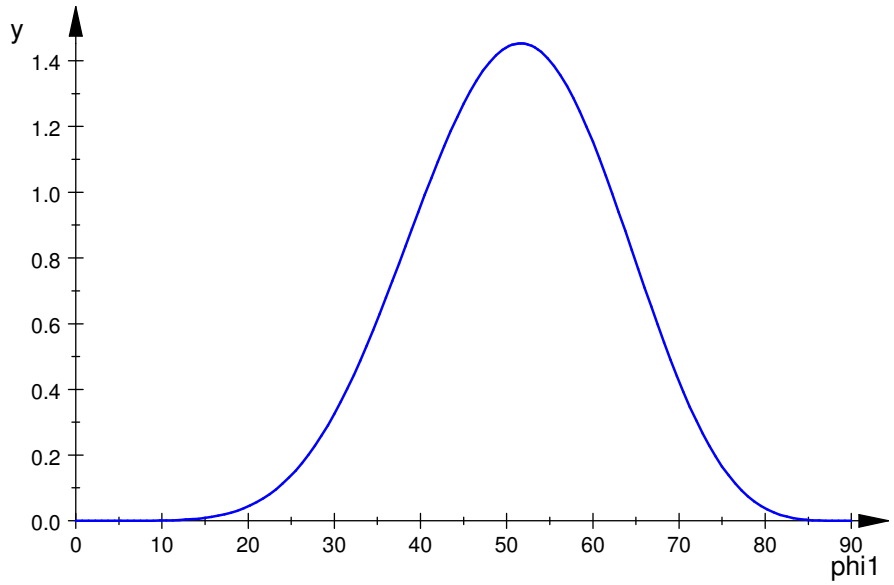
Vertikaldiagramm, y=Horizontale

```
plot(plot::Polar([c(wh,phi1),phi1+PI/2], phi1 = 0..PI/2,
TicksNumber=None, Scaling=Constrained));
```




vertikale relative Strahlungsleistungsdichte

- `plotfunc2d(c(wh,phi1*PI/180)^2, phi1 = 0..90):`




Maximalwert der relativen Stahlungsleistungsdichte , auch in dBi

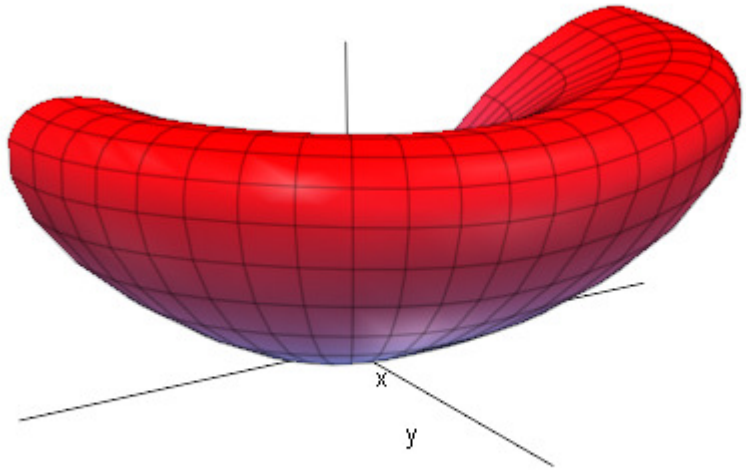
- ```
  gvmax:=0:gvwmax:=0:for m from 0 to 2879 step 1 do
  gv:=float(c(wh,m*PI/5760)^2);
  if gv>gvmax then
       gvmax:=gv;
       gvwmax:=float(m/32);
  end_if;
  end_for:gvmax;float(10*ln(gvmax)/ln(10)+2.15);gvwmax;
  ```
  ```

1.453017948

3.772709787

51.59375

- ```
  delete
  the,phi1:graph:=plot::Surface([cos(the)*sin(phi1)*c(the,phi1),sin(th
  e)*sin(phi1)*c(the,phi1),cos(phi1)*c(the,phi1)],the=0..PI, phi1=-
  PI/2..0,Axes=Origin, TicksNumber=None, Scaling=Constrained,
  AdaptiveMesh=4):
  ```
- ```
  plot(graph);
  ```

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