Ingenieurbüro Baumann --- www.leobaumann.de --- 46282 Dorsten, Markt 6
manuelle Berechnung eines horizontalen 5x5-Quad (5 Quads nebeneinander) in einer Höhe b2 über Grund
h = Länge, d = Distanz, d1 = Distanz 2. Element, b2 = Höhe über Grund, l = Wellenlänge

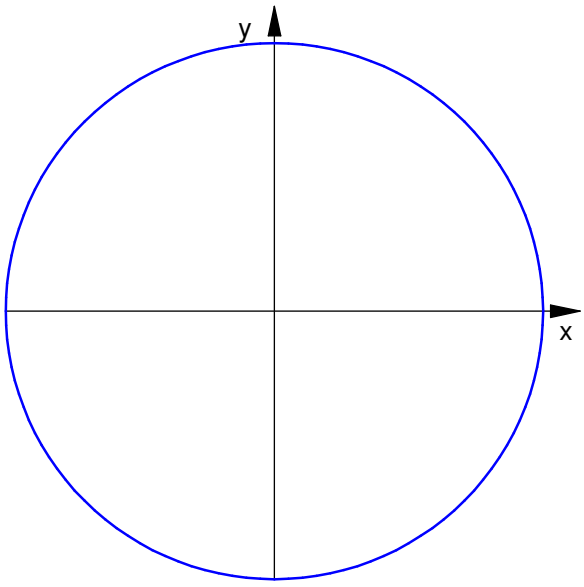
```
reset():digits:=16:wh:=0*PI/180:k:=1/1000:wv:=0*PI/180:w:=90*PI/180:
h:=40:d:=h:b2:=12:l:=80:
```

Richtdiagramm im Kugelraum als Funktion der Winkel

```
c:=(the,phi1) -> (abs((cos(PI*5*h/l*cos(the-k)*sin(phi1))-
cos(PI*5*h/l))/(sqrt(1-cos(the-k)^2*sin(phi1)^2)))
                 *2*abs(cos(PI*d/l*sin(phi1)*sin(the)))
                 *2*abs(cos(PI*2*d/l*sin(phi1)*sin(the)))
                 *2*abs(cos(PI*3*d/l*sin(phi1)*sin(the)))
                 *2*abs(cos(PI*4*d/l*sin(phi1)*sin(the)))
                 *2*abs(cos(PI*5*d/l*sin(phi1)*sin(the)))
                 +abs((cos(PI*5*h/l*cos(the-w-k)*sin(phi1))-
  cos(PI*5*h/l))/(sqrt(1-cos(the-w-k)^2*sin(phi1)^2)))
                 *2*abs(cos(PI*d/l*sin(phi1)*sin(the-w)))
                 *2*abs(cos(PI*2*d/l*sin(phi1)*sin(the-w-k)))
                 *2*abs(cos(PI*3*d/l*sin(phi1)*sin(the-w-k)))
                 *2*abs(cos(PI*4*d/l*sin(phi1)*sin(the-w-k)))
                 *2*abs(cos(PI*5*d/l*sin(phi1)*sin(the-w-k))))
                 *2*abs(sin(PI*2*b2/l*cos(phi1))):
```

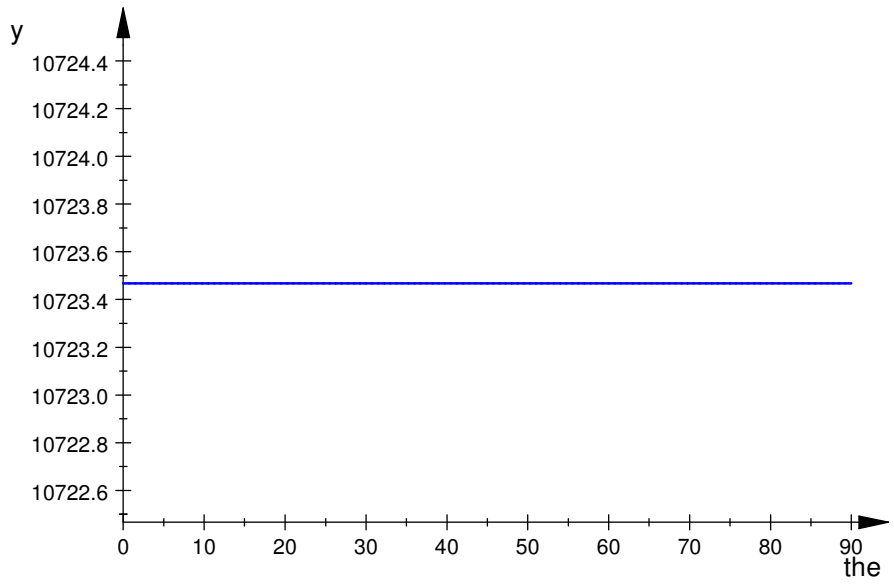
Horizontaldiagramm

```
plot(plot::Polar([c(the,wv),the], the = 0..2*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 2880 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;
```

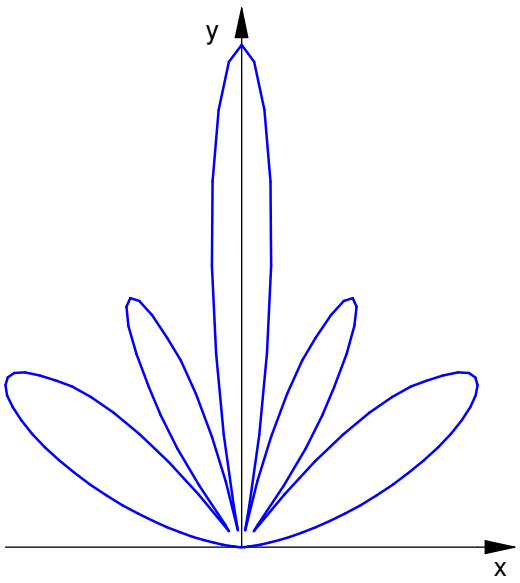
10723.46722

42.45335228

0.0

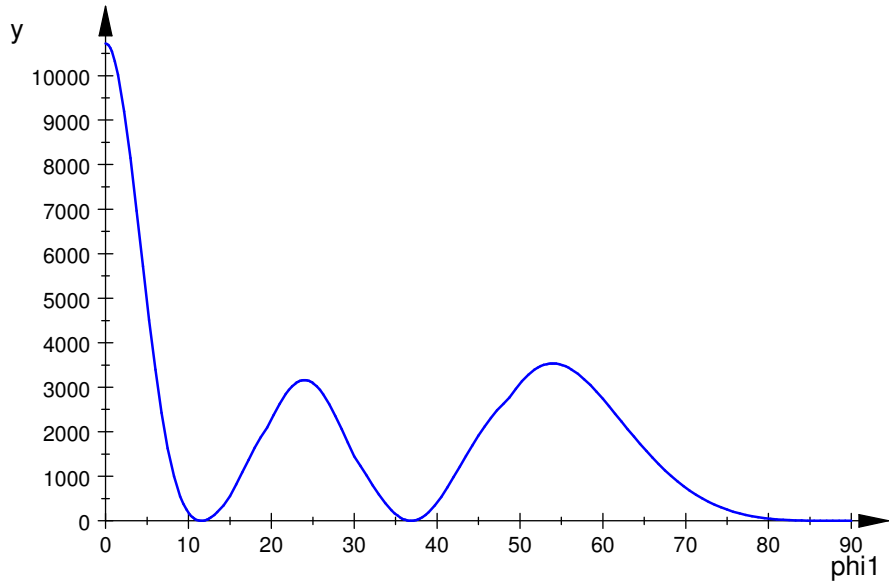
Vertikaldiagramm

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



vertikale relative Strahlungsleistungsdichte

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



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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;
```

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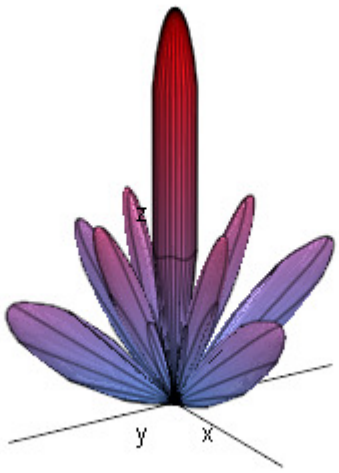
0.0

- ```
  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..2*PI, phi1=-
  PI/2..PI/2,Axes=Origin, TicksNumber=None, Scaling=Constrained,
  AdaptiveMesh=4):
  ```
- ```
  plot(graph);
  ```



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