Ingenieurbüro Baumann --- www.leobaumann.de --- Markt 6, 46282 Dorsten
manuelle Berechnung eines vertikalen Kreuz-Dipols vor Reflektor über perfektem Grund
h = Länge, l = Wellenlänge, b2 = Höhe über Grund, d1 = Reflektorabstand

```
reset():digits:=16:k:=1/1000:wh:=90*PI/180:wv:=77.25*PI/180:b2:=1/2:
d1:=1/2:h:=1/2:l:=1:d2=1/1000:k1:=h/l:
```

Richtdiagramm im Kugelraum als Funktion der Winkel

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

Antennenimpedanzen nach BALANIS mittengespeist

```
float(30*(EULER+ln(2*PI*k1)-
Ci(2*PI*k1)+1/2*sin(2*PI*k1)*(Si(4*PI*k1)-
2*Si(2*PI*k1))+1/2*cos(2*PI*k1)*(EULER+ln(PI*k1)+Ci(4*PI*k1)-
2*Ci(2*PI*k1))));
```

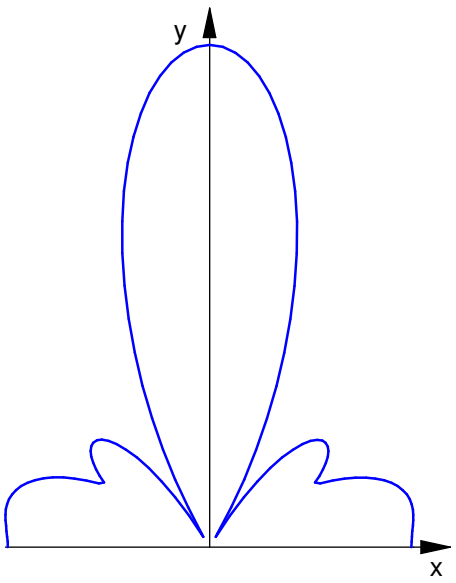
36.5648009

```
float(15*(2*Si(2*PI*k1)+cos(2*PI*k1)*(2*Si(2*PI*k1)-Si(4*PI*k1))-
sin(2*PI*k1)*(2*Ci(2*PI*k1)-Ci(4*PI*k1)-Ci(2*2*PI*d2^2/4/k1/l^2))));
```

21.27227364

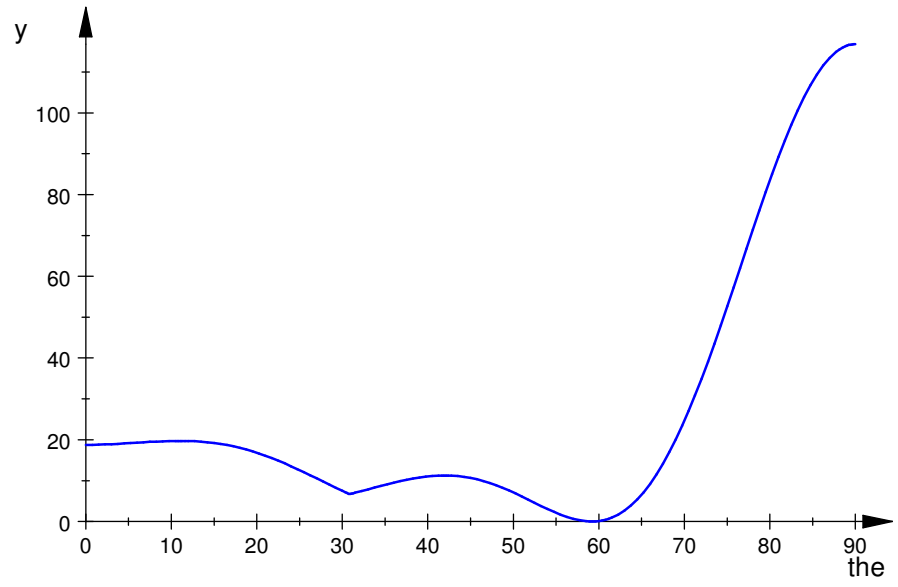
Horizontaldiagramm

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

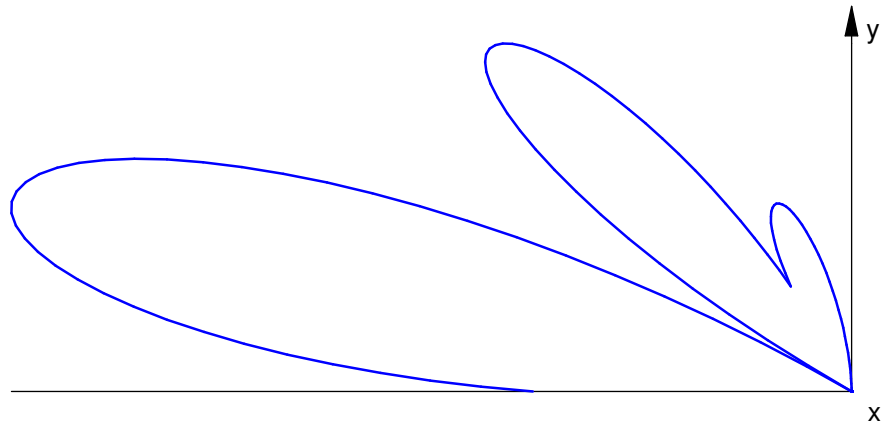
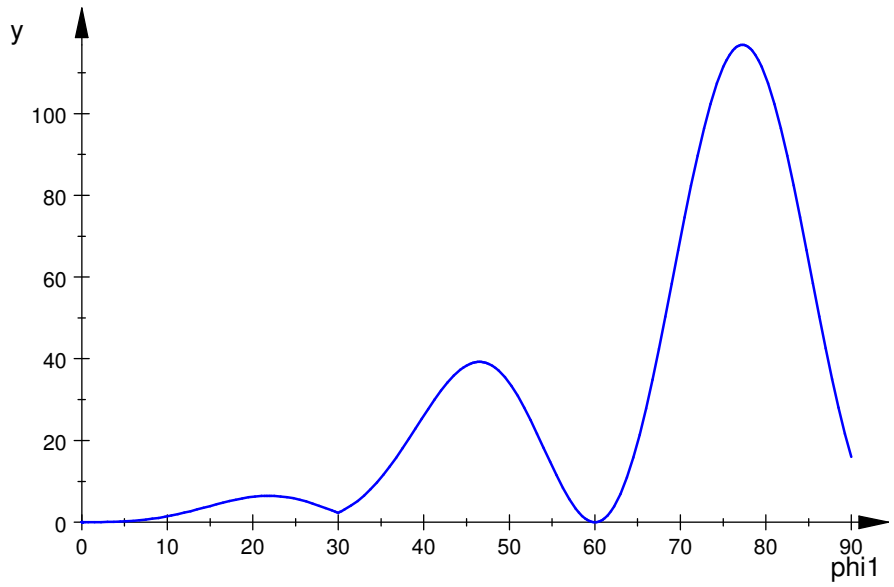


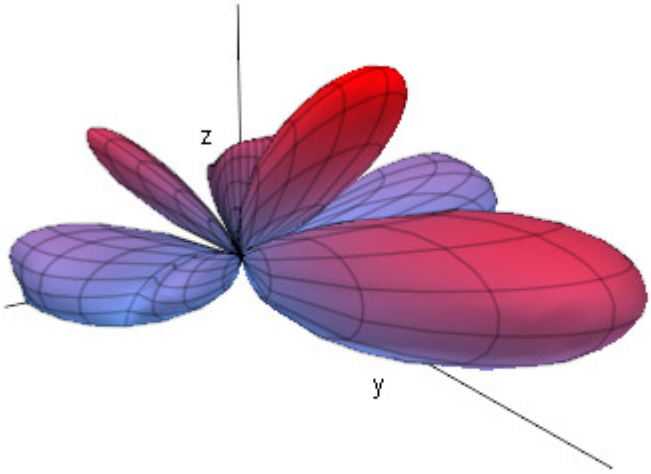
horizontale relative Strahlungsleistungsdichte

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



Maximalwert der relativen Stahlungsleistungsdichte , auch in dBi, Erhebungswinkel 0 Grad

- ```
  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;
  ```
  ```

116.8077747

22.8247175

89.96875

Vertikaldiagramm

- `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 1 to 2880 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;
  ```

  116.8082711

  22.82473596

  77.25

- ```
  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=-PI..0,
  phi1=0..PI/2,Axes=Origin, TicksNumber=None, Scaling=Constrained,
  AdaptiveMesh=4):
  ```
- ```
  plot(graph);
  ```
  ```


z
y

-
-