

Ingenieurbüro Baumann --- www.leobaumann.de --- Markt 6, 46282 Dorsten

manuelle Berechnung eines Quad-Lazy-H-Dipols über Grund

h = Länge, b2 = Höhe über Grund (Unterkante), d = Dipolabstand, bet = Phasenverschiebung, l = Wellenlänge, Zl = Wellenwiderstand Feederleitung, d1 = Leiterabstand Leitung, d2 = Antennendistanz, dd = Drahtdurchmesser

- `reset():digits:=16:k:=1/1000:wh:=90*PI/180:vw:=73.0625*PI/180:h:=1/2:dd:=2/1000:b2:=1/2:d:=3/8:l:=1:bet:=180*PI/180:Zl:=400:d1:=4/100:d2:=1:`

Richtdiagramm im Kugelraum als Funktion der Winkel

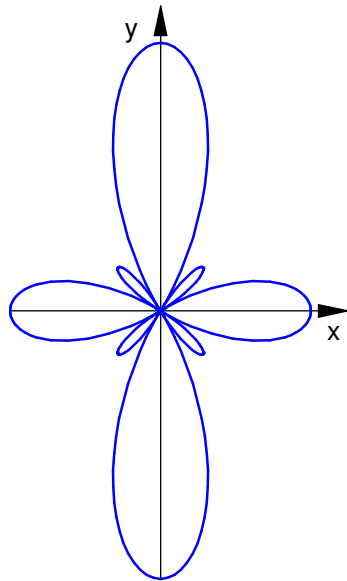
- `c:=(the,phil) -> (abs((cos(PI*h/l*cos(the)*sin(phil))-cos(PI*h/l))/(sqrt(1-cos(the)^2*sin(phil-k)^2)))*2*abs(sin(bet/2+PI*2*d/l*cos(phil))) +abs((cos(PI*d/l*cos(phil))-cos(PI*d/l))/sin(phil))*2*abs(cos(PI*d1/l*cos(the)*sin(phil))) *2*abs(cos(PI*d2/l*sin(the)*sin(phil))) *2*abs(cos(PI*d2/l*sin(phil)*cos(the))) *2*abs(sin(PI*2*(b2+d/2)/l*cos(phil)))):`

Antennenimpedanzen pro Element nach BALANIS mittengespeist, feedgekoppelt über Zl=400 Ohm

- `Z:=float(60*(EULER+ln(2*PI*h/l)-Ci(2*PI*h/l)+1/2*sin(2*PI*h/l)*(Si(4*PI*h/l)-2*Si(2*PI*h/l))+1/2*cos(2*PI*h/l)*(EULER+ln(PI*h/l)+Ci(4*PI*h/l)-2*Ci(2*PI*h/l)))+I*30*(2*Si(2*PI*h/l)+cos(2*PI*h/l)*(2*Si(2*PI*h/l)-Si(4*PI*h/l))-sin(2*PI*h/l)*(2*Ci(2*PI*h/l)-Ci(4*PI*h/l)-Ci(2*2*PI*dd^2/4/h/l/l^2)))):`
- `Zt:=(Z*cos(2*PI*l*d)+I*Zl*sin(2*PI*l*d))/(I*Z/Zl*sin(2*PI*l*d)+cos(2*PI*l*d)):`
- `Zin:=float(1/4*Z*Zt/(Z+Zt));`
`20.57622102 + 5.5887135 · i`

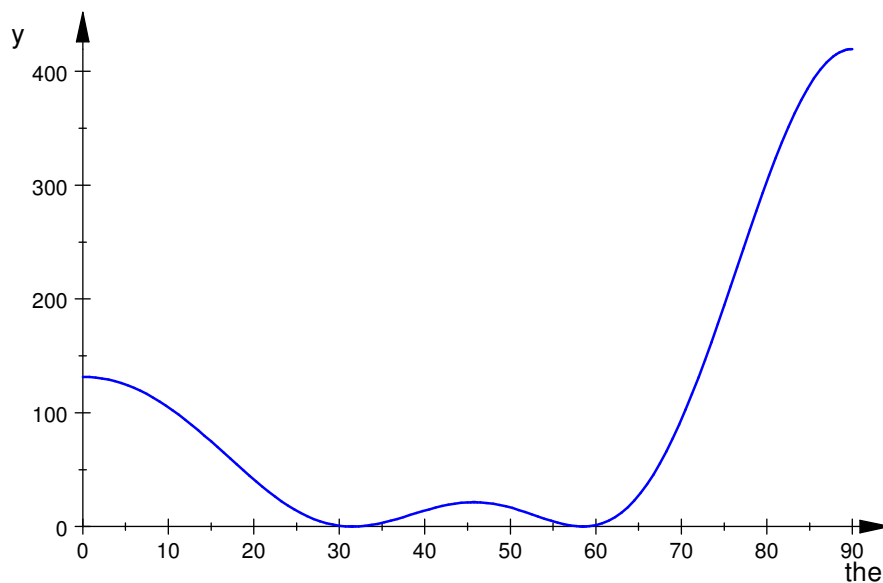
Horizontaldiagramm

- `plot(plot::Polar([c(the,vw),the], the = 0..2*PI, TicksNumber=None, Scaling=Constrained, AdaptiveMesh=4));`



horizontale relative Strahlungsleistungsdichte

- `plotfunc2d(c(the*PI/180,wv)^2, the = 0..90, AdaptiveMesh=4):`



Maximalwert der relativen Strahlungsleistungsdichte , auch in dBi

- `ghmax:=0:ghwmax:=0:for m from 2240 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;`

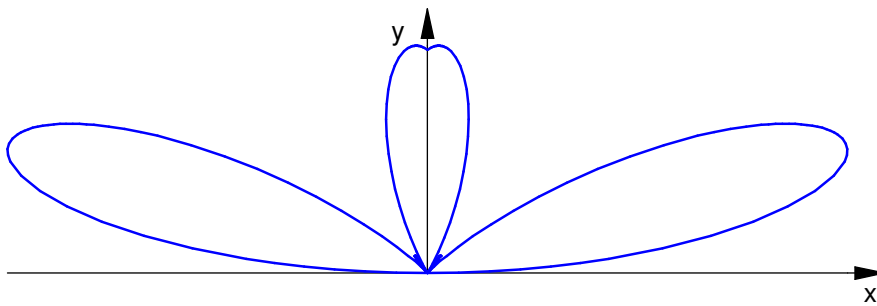
419.545747

28.37779323

89.96875

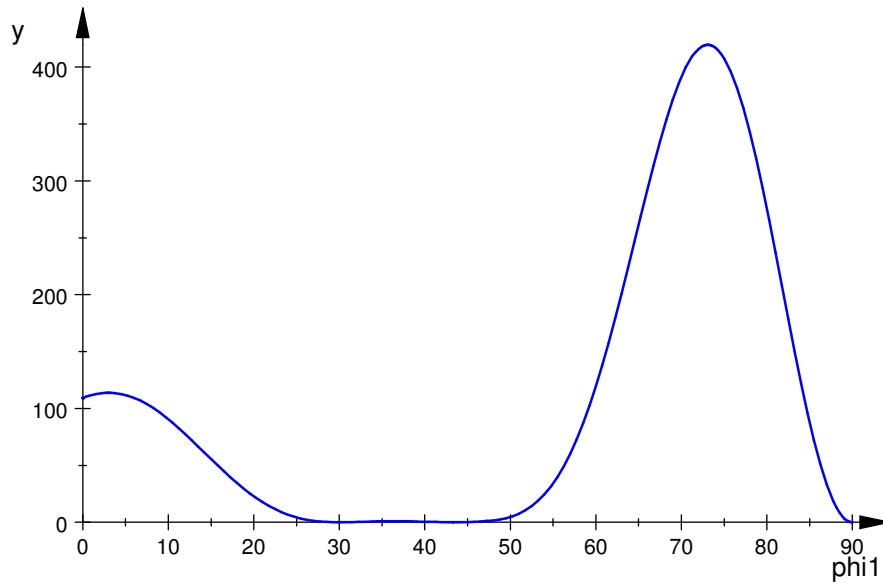
Vertikaldiagramm

- `plot(plot::Polar([c(wh,phi1),phi1+PI/2], phi1 = -PI/2..PI/2, TicksNumber=None, Scaling=Constrained, AdaptiveMesh=4));`



vertikale relative Strahlungsleistungsdichte

- `plotfunc2d(c(wh,phi1*PI/180)^2, phi1 = 0..90, AdaptiveMesh=4):`



-
- Maximalwert der relativen Strahlungsleistungsdichte , auch in dBi
- `gvmax:=0:gvwmax:=0:for m from 1920 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;`

419.547022

28.37780643

73.0625

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

