2.1 Diffraction on a planar absorbing object

Developing Matlab

The program is based on the principle of the Fresnel diffraction. Therefore, Fresnel integrals have to be evaluated, and then, the attenuation of the wave propagation can be computed. The Fresnel integrals are computed the following way:

```
sig=sign(v);
v=abs(v);
fv=(1+.926*v)/(2+1.792*v+3.104*v^2);
gv=1/(2+4.142*v+3.492*v^2+6.67*v^3);
    if v==0 v=1e-8; end
av=pi/2*v^2;
cx(n)=(.5+fv*sin(av)-gv*cos(av))*sig;
sx(n)=(.5-fv*cos(av)-gv*sin(av))*sig;
v=v*sig;
```

Values of `cx` and `sx` are later used for computing the attenuation:

```
b=sqrt((cx(n)-0.5)^2+(sx(n)-0.5)^2)/sqrt(2)*100;
h=sv/r1;
db=8.68*log(b/100);
```

In the program, radii of the first four Fresnel zones are computed.

```
r1=round(10*sqrt(la*h_prijimac*h_vysilac/(h_prijimac+h_vysilac)*1000))/10;
r2=round((r1*14.14))/10;
r3=round((r1*17.32))/10;
r4=round((r1*20))/10;
```