
Appendix A

Input power calculation

Abstract

This appendix presents the Matlab file used in calculation of input power. The listing of the file is attached and the results from the program are shown.

A.1. Matlab file used in computations	Page 144
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A.1. Matlab file used in computations

The listing of the Matlab file used to compute the input power is giving in the following. The results, returned by the program, may be found after the listing.

```
function InputPower
%all values here are only coefficients not power!!!
MaxSize=100;
StepSize=100;
fi=0:pi/(StepSize*2):pi/2;
theta=0:pi/(StepSize*2):pi/2;

for i=1:StepSize
    for j=1:StepSize

power(i,j)=cos(fi(i))*sin(theta(j))+sin(fi(i))*sin(theta(j))+cos(theta(j));
        end
    end
%f=power;
surface(power);
set(gca,'XTickLabel',{'0°','9°','18°','27°','36°','45°','54°','63°','72°','81°',
'90°'})
set(gca,'YTickLabel',{'0°','9°','18°','27°','36°','45°','54°','63°','72°','81°',
'90°'})
xlabel('\vartheta 0-90°')
ylabel('fi 0-90°')
zlabel('Power coefficient')
grid on
%colormap(autumn);

%find maximum value
max_value=-inf;
Max_fi=0;
Max_theta=0;
for i=1:MaxSize
    for j=1:MaxSize
        if power(i,j)>max_value
            max_value=power(i,j);
            Max_fi=i;
            Max_theta=j;
        end
    end
end

%values for maximum angle in degrees
maximum_angle_fi=(Max_fi*pi/(MaxSize*2))*180/pi
maximum_angle_theta=(Max_theta*pi/(MaxSize*2))*180/pi
max_value

%find average value
average_value=0;

for i=1:MaxSize
    for j=1:MaxSize
        average_value = average_value + power(i,j);
    end
end
```

```
average_value = average_value/(MaxSize*MaxSize)
```

Results from running the program:

```
maximum_angle_fi =
```

```
45.9000
```

```
maximum_angle_theta =
```

```
55.8000
```

```
max_value =
```

```
1.7320
```

```
average_value =
```

```
1.4458
```

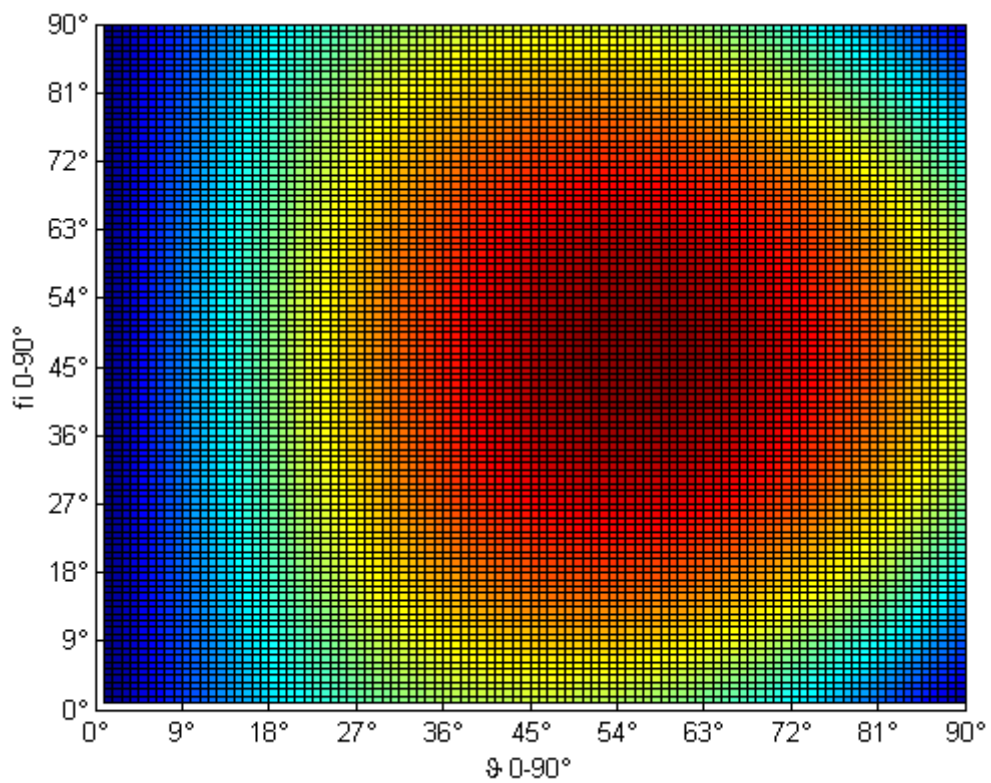


Figure A.1 Plotted result of the program