Phasenanschnitt-Steuerung / Gleichrichter

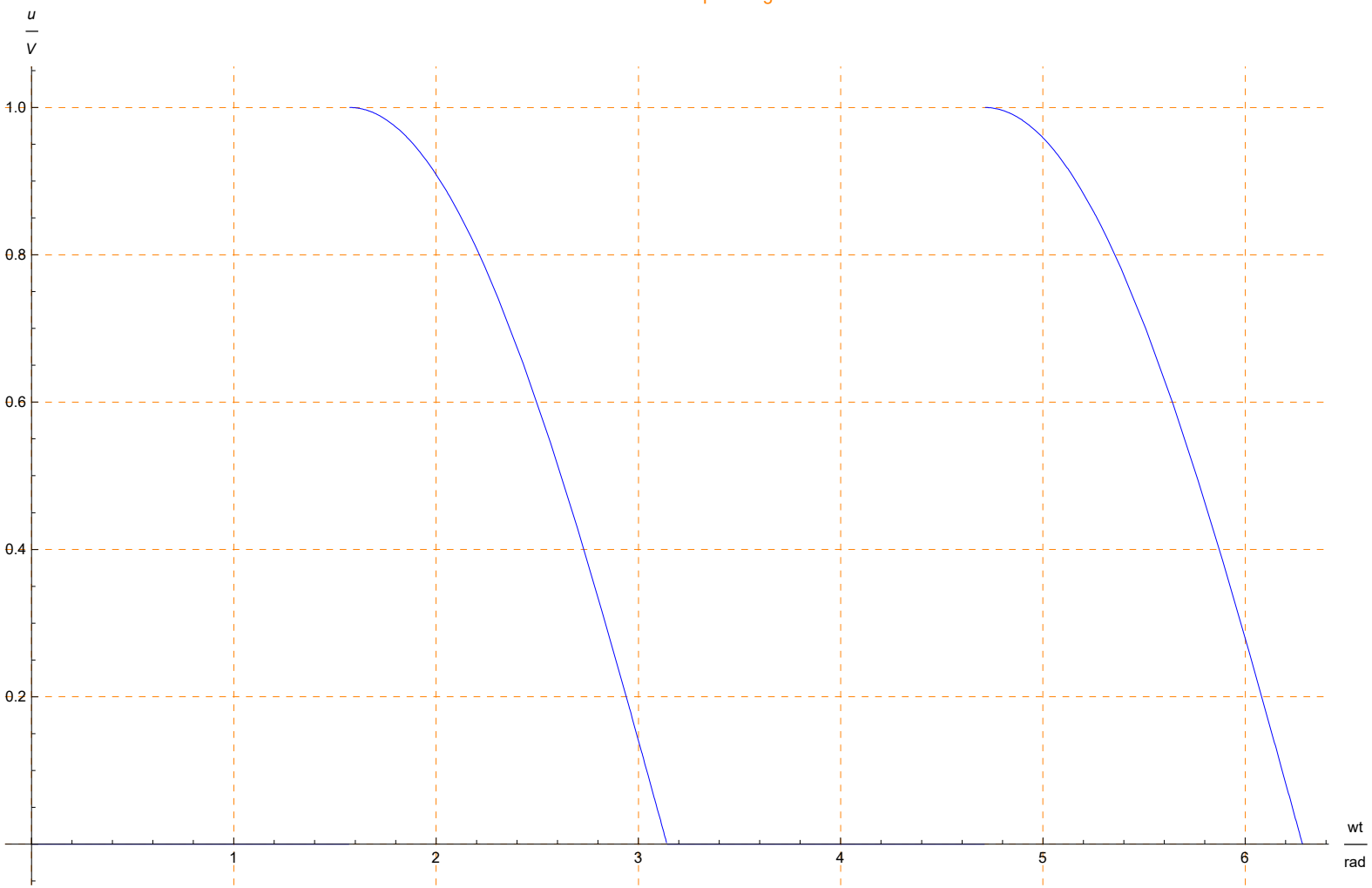
In[1]:=
```
w = 90 * Degree;
```
Grad

```
u[omt_] = Piecewise[{{0, omt < w}, {Sin[omt], w <= omt < Pi}, {0, Pi <= omt < w + Pi}, {-Sin[omt], Pi + w <= omt < 2 * Pi}}];
```
stückweise | Sinus | Kreiszah··· | Kreiszahl π | Kreisza·· | Sinus | Kreiszahl π | Kreiszahl

```
Plot[u[omt], {omt, 0, 2 * Pi}, AxesOrigin → {0, 0}, GridLines → Automatic, GridLinesStyle → Directive[Orange, Dashed],
 PlotLabel → "Phasenanschnittspannung", AxesLabel → {wt / rad, u / V}, PlotStyle → {Thin, Blue}]
```
stelle Funktion graphisch dar | Kre··· | Achsenursprung | Gitternetzlinien | automatisch | Stil der Gitternetzlinien | Anweisung | orange | gestrichelt

Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau

Out[3]=

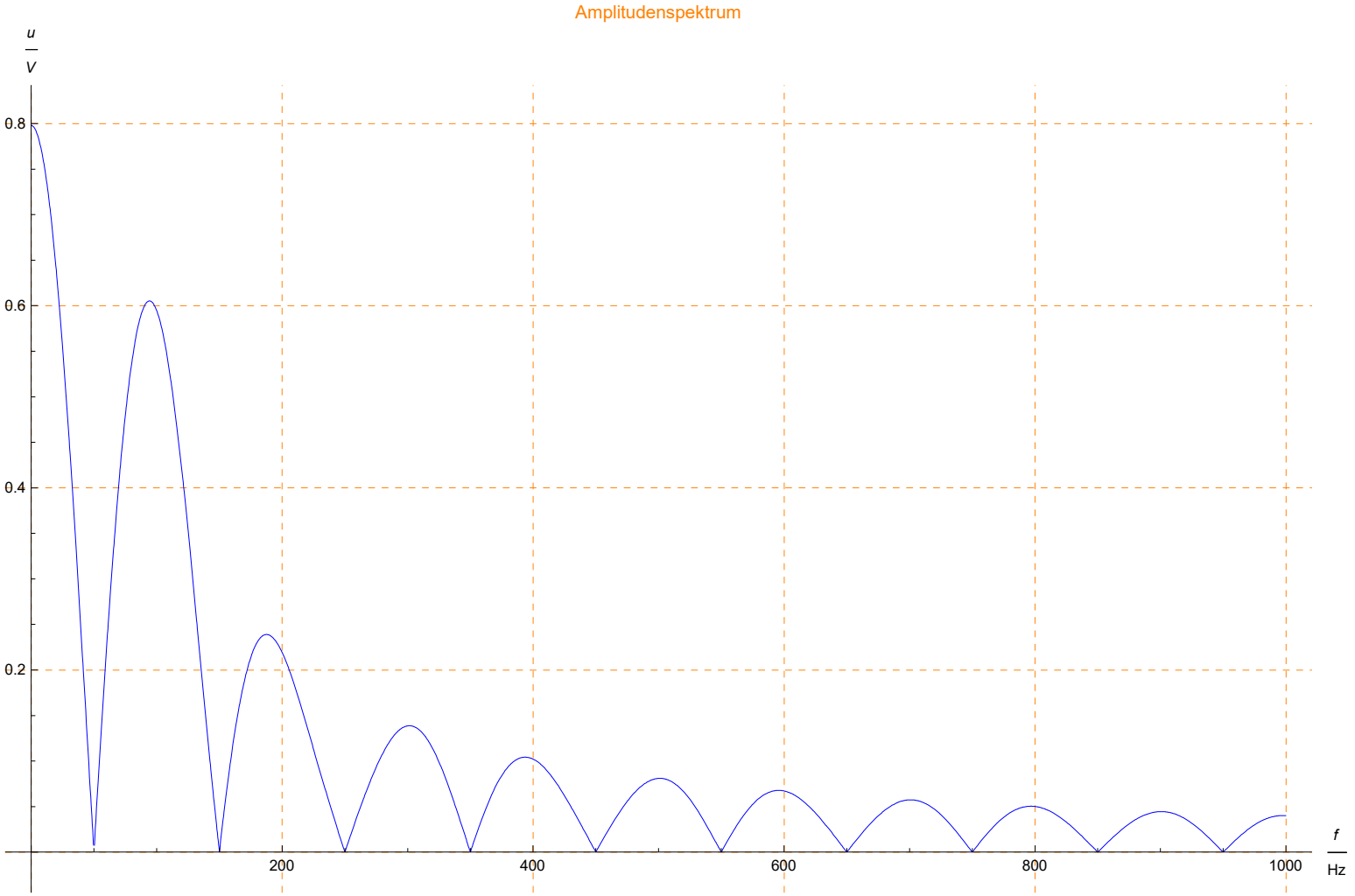


In[4]:=
```
S[f_] = FourierTransform[u[omt], omt, f / 50]
```
Fourier−Transformation

Out[4]=
$$-\frac{25\left(50\, e^{\frac{i f \pi}{50}}+50\, e^{\frac{i f \pi}{25}}-i\, e^{\frac{9 i \circ f}{5}} f-i\, e^{\frac{27 i \circ f}{5}} f\right)\sqrt{\frac{2}{\pi}}}{-2500+f^2}$$

In[5]:=
```
Plot[Abs[S[f]], {f, 0, 1000}, PlotRange → All, AxesOrigin → {0, 0}, GridLines → Automatic,
 GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "Amplitudenspektrum", AxesLabel → {f / Hz, u / V}, PlotStyle → {Thin, Blue}]
```

Out[5]=



In[6]:=
```
Print[NumberForm[N[Abs[S[0]]], 16], " Volt Gleichspannungsanteil"]
```
gib aus | Zahlenform | ·· | Absolutwert

```
TableForm[
```
Tabellendarstellung

```
 Grid[Table[{k, " MHz", NumberForm[N[20 * Log[10, Abs[S[k * 1*^6] / 1*^-6]]], 16], " dBuV"}, {k, 1, 100}], Frame → All, Alignment → Left]]
```
Tabelle | Zahlenform | nume·· | Logarit··· | Absolutwert | Rahmen | alle | Ausrichtung | links

```
0.7978845608028654 Volt Gleichspannungsanteil
```

Out[7]//TableForm=

1	MHz	32.01820134899093	dBuV
2	MHz	25.99760141128225	dBuV
3	MHz	22.47577622564472	dBuV
4	MHz	19.97700149189535	dBuV
5	MHz	18.03880123100135	dBuV
6	MHz	16.45517630965075	dBuV
7	MHz	15.11624051679845	dBuV
8	MHz	13.95640157708891	dBuV
9	MHz	12.93335112803448	dBuV
10	MHz	12.01820131674457	dBuV
11	MHz	11.19034761352354	dBuV
12	MHz	10.43457639569255	dBuV
13	MHz	9.73933427047485	dBuV
14	MHz	9.09564060302027	dBuV
15	MHz	8.49637613544999	dBuV
16	MHz	7.935801663427587	dBuV
17	MHz	7.409222888966076	dBuV
18	MHz	6.912751214453259	dBuV
19	MHz	6.443129297452495	dBuV
20	MHz	5.997601403220656	dBuV
21	MHz	5.573815421814323	dBuV
22	MHz	5.169747700042021	dBuV

23	MHz	4.783644596128564	dBuV
24	MHz	4.413976482243278	dBuV
25	MHz	4.059401143030212	dBuV
26	MHz	3.718734357050673	dBuV
27	MHz	3.390926033283784	dBuV
28	MHz	3.075040689616011	dBuV
29	MHz	2.770241358478457	dBuV
30	MHz	2.475776222061793	dBuV
31	MHz	2.190967439767288	dBuV
32	MHz	1.91520175005254	dBuV
33	MHz	1.64792251889101	dBuV
34	MHz	1.388622975601925	dBuV
35	MHz	1.136840429439927	dBuV
36	MHz	0.892151301098237	dBuV
37	MHz	0.6541668351027441	dBuV
38	MHz	0.4225293841052022	dBuV
39	MHz	0.1969091759102815	dBuV
40	MHz	-0.02299851012004025	dBuV
41	MHz	-0.2374758179564839	dBuV
42	MHz	-0.4467844915206953	dBuV
43	MHz	-0.6511677951552645	dBuV
44	MHz	-0.850852213288075	dBuV
45	MHz	-1.046048959071939	dBuV
46	MHz	-1.236955317197238	dBuV
47	MHz	-1.423755842280754	dBuV
48	MHz	-1.606623431078757	dBuV
49	MHz	-1.785720284137857	dBuV
50	MHz	-1.961198770288496	dBuV
51	MHz	-2.133202205527354	dBuV
52	MHz	-2.301865556265088	dBuV
53	MHz	-2.467316075585335	dBuV

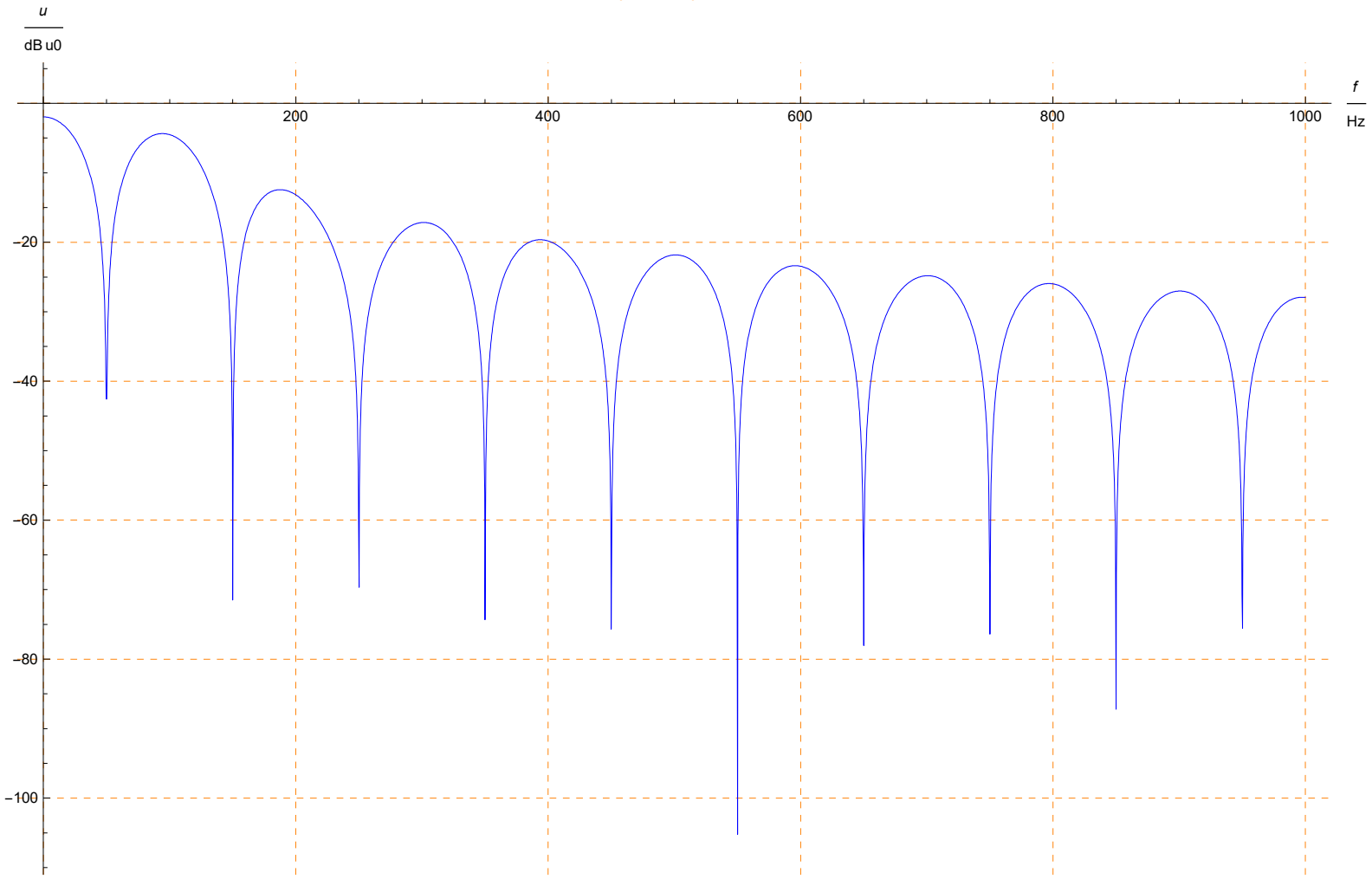
54	MHz	−2.62967388002935	dBuV
55	MHz	−2.789052473455259	dBuV
56	MHz	−2.945559223694771	dBuV
57	MHz	−3.099295797020952	dBuV
58	MHz	−3.250358554830214	dBuV
59	MHz	−3.398838916414676	dBuV
60	MHz	−3.544823691244975	dBuV
61	MHz	−3.688395383787736	dBuV
62	MHz	−3.829632473537752	dBuV
63	MHz	−3.968609672644577	dBuV
64	MHz	−4.105398163250942	dBuV
65	MHz	−4.240065816430551	dBuV
66	MHz	−4.372677394411045	dBuV
67	MHz	−4.503294737590423	dBuV
68	MHz	−4.631976937698832	dBuV
69	MHz	−4.758780498319416	dBuV
70	MHz	−4.883759483859639	dBuV
71	MHz	−5.006965657956193	dBuV
72	MHz	−5.128448612200236	dBuV
73	MHz	−5.248255885984156	dBuV
74	MHz	−5.366433078194725	dBuV
75	MHz	−5.48302395140936	dBuV
76	MHz	−5.598070529191339	dBuV
77	MHz	−5.711613187025294	dBuV
78	MHz	−5.823690737385405	dBuV
79	MHz	−5.934340509384757	dBuV
80	MHz	−6.04359842341493	dBuV
81	MHz	−6.151499061149179	dBuV
82	MHz	−6.25807573125064	dBuV
83	MHz	−6.363360531097898	dBuV
84	MHz	−6.467384404814165	dBuV

85	MHz	-6.570177197862495	dBuV
86	MHz	-6.671767708448099	dBuV
87	MHz	-6.772183735949216	dBuV
88	MHz	-6.871452126580316	dBuV
89	MHz	-6.96959881647529	dBuV
90	MHz	-7.066648872363625	dBuV
91	MHz	-7.162626529999087	dBuV
92	MHz	-7.257555230488407	dBuV
93	MHz	-7.351457654656086	dBuV
94	MHz	-7.444355755571436	dBuV
95	MHz	-7.536270789354496	dBuV
96	MHz	-7.627223344368982	dBuV
97	MHz	-7.717233368902583	dBuV
98	MHz	-7.806320197427655	dBuV
99	MHz	-7.894502575528826	dBuV
100	MHz	-7.981798683577891	dBuV

In[8]:=
```
Plot[20 * Log[10, Abs[S[f]]], {f, 0, 1000}, PlotRange → All, AxesOrigin → {0, 0}, GridLines → Automatic,
 GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "Amplitudenspektrum", AxesLabel → {f / Hz, u / u0 / dB}, PlotStyle → {Thin, Blue}]
```
stelle Funk· | Logarit··· | Absolutwert | Koordinatenb··· | alle | Achsenursprung | Gitternetzlinien | automatisch

Stil der Gitternetzlinien | Anweisung | orange | gestrichelt | Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau

Out[8]=


Amplitudenspektrum
u
dB u0
f
Hz
200
400
600
800
1000
−20
−40
−60
−80
−100