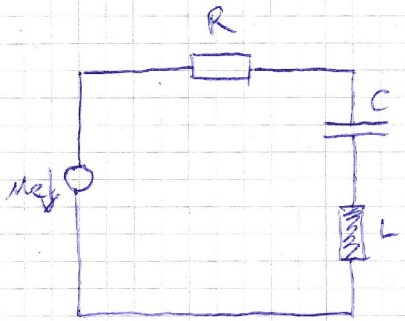
In[ ]:=
```
Import["D:\\Rescue\\Merken-nbs-mnbs\\Differentialgleichungen\\RLC_Diff_Ein2.jpg"]
```
importiere | leite ab

Out[ ]=



$$u_R + u_L + u_C = u_e$$

$$i = C \frac{du_c}{dt}$$

$$\frac{di}{dt} = C \cdot \frac{d^2 u_c}{dt^2}$$

$$RC\, du_c/dt + LC \frac{d^2 u_c}{dt^2} + u_c = u_e$$

$$\frac{d^2 u_c}{dt^2} + \frac{R}{L}\frac{du_c}{dt} + \frac{1}{LC} \cdot u_c = u_e / LC \;//$$

$$i_C = C \cdot \frac{du_c}{dt} \;//$$

In[ ]:=
```
ClearAll[il, f0, Rg, Cc, Ll, ue, uc, erg];
```
lösche alle

In[ ]:=
```
f0 = 5*^3; Rg = 1*^2; Cc = 100*^-9;
Ll = 1 / ((2 * Pi * f0) ^2 * Cc);
```
Kreiszahl π

```
ue[t_] := Sin[2 * Pi * f0 * t];
```
Sinus Kreiszahl π

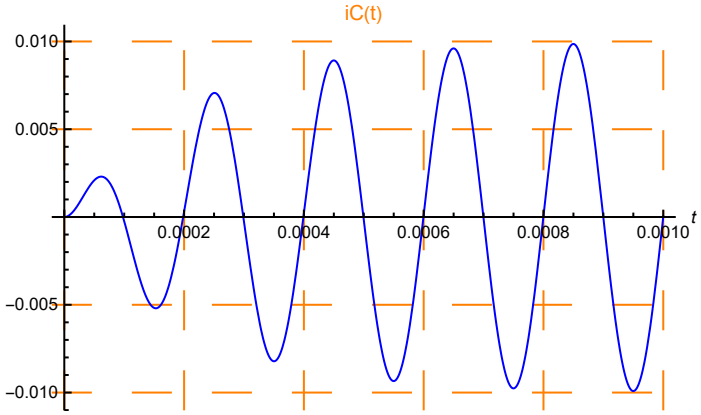
In[ ]:=
```
erg = DSolve[{uc''[t] + Rg / Ll * uc'[t] + uc[t] / Ll / Cc - ue[t] / Ll / Cc == 0, uc'[0] == 0, uc[0] == 0}, uc[t], t] // Simplify
```
löse Differentialgleichung vereinfache

Out[ ]=
$$\left\{\left\{uc[t] \to -\frac{1}{\pi\sqrt{400-\pi^2}}\right.\right.$$
$$5\, e^{-500\pi^2 t}\left(\cos\left[500\pi\sqrt{400-\pi^2}\,t\right]\left(-2\sqrt{400-\pi^2}+e^{500\pi^2 t}\left(20+\sqrt{400-\pi^2}\right)\cos\left[500\pi\left(-20+\sqrt{400-\pi^2}\right)t\right]+e^{500\pi^2 t}\left(-20+\sqrt{400-\pi^2}\right)\right.\right.$$
$$\left.\cos\left[500\pi\left(20+\sqrt{400-\pi^2}\right)t\right]-e^{500\pi^2 t}\pi\sin\left[500\pi\left(-20+\sqrt{400-\pi^2}\right)t\right]-e^{500\pi^2 t}\pi\sin\left[500\pi\left(20+\sqrt{400-\pi^2}\right)t\right]\right)+$$
$$\sin\left[500\pi\sqrt{400-\pi^2}\,t\right]\left(-2\pi+e^{500\pi^2 t}\pi\cos\left[500\pi\left(-20+\sqrt{400-\pi^2}\right)t\right]+e^{500\pi^2 t}\pi\cos\left[500\pi\left(20+\sqrt{400-\pi^2}\right)t\right]+\right.$$
$$20\, e^{500\pi^2 t}\sin\left[500\pi\left(-20+\sqrt{400-\pi^2}\right)t\right]+e^{500\pi^2 t}\sqrt{400-\pi^2}\sin\left[500\pi\left(-20+\sqrt{400-\pi^2}\right)t\right]-$$
$$\left.\left.\left.20\, e^{500\pi^2 t}\sin\left[500\pi\left(20+\sqrt{400-\pi^2}\right)t\right]+e^{500\pi^2 t}\sqrt{400-\pi^2}\sin\left[500\pi\left(20+\sqrt{400-\pi^2}\right)t\right]\right)\right)\right\}\right\}$$

In[ ]:=
```
uc[t_] = uc[t] /. erg[[1]];
```

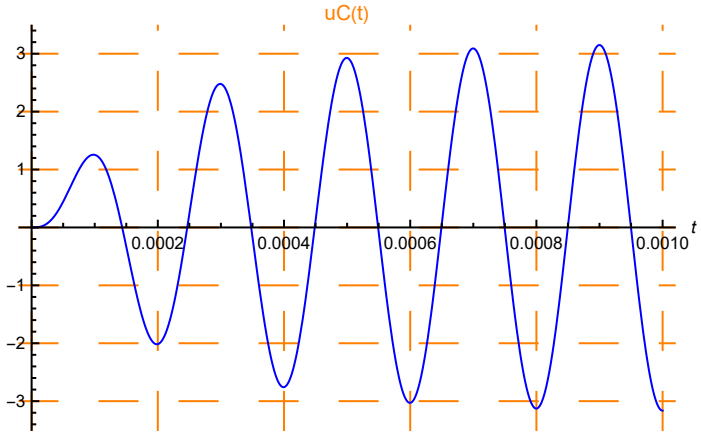
In[ ]:=
```
Plot[Cc * uc'[t], {t, 0, 5 / f0}, AxesOrigin → {0, 0}, GridLines → Automatic,
 GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "iC(t)", AxesLabel → {}, PlotStyle → {Thin, Blue}, PlotRange → Full]
```
stelle Funktion graphisch dar | Achsenursprung | Gitternetzlinien | automatisch | Stil der Gitternetzlinien | Anweisung | orange | gestrichelt | Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau | Koordinatenb··· | komplett

Out[ ]=



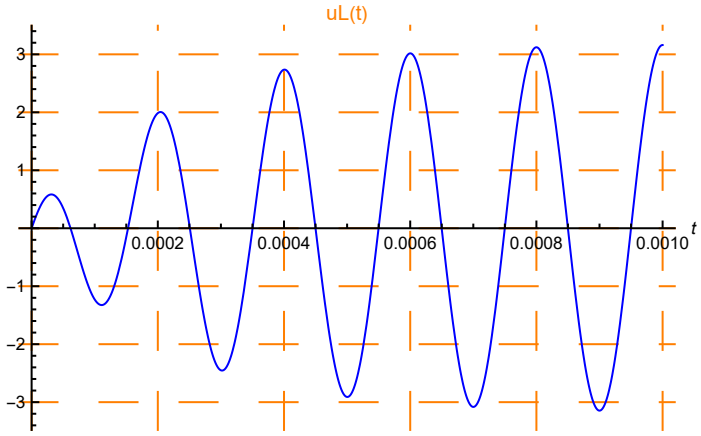
In[ ]:=
```
Plot[uc[t], {t, 0, 5 / f0}, AxesOrigin → {0, 0}, GridLines → Automatic, GridLinesStyle → Directive[Orange, Dashed],
 PlotLabel → "uC(t)", AxesLabel → {}, PlotStyle → {Thin, Blue}, PlotRange → Full]
```
stelle Funktion graphisch dar | Achsenursprung | Gitternetzlinien | automatisch | Stil der Gitternetzlinien | Anweisung | orange | gestrichelt | Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau | Koordinatenb··· | komplett

Out[ ]=



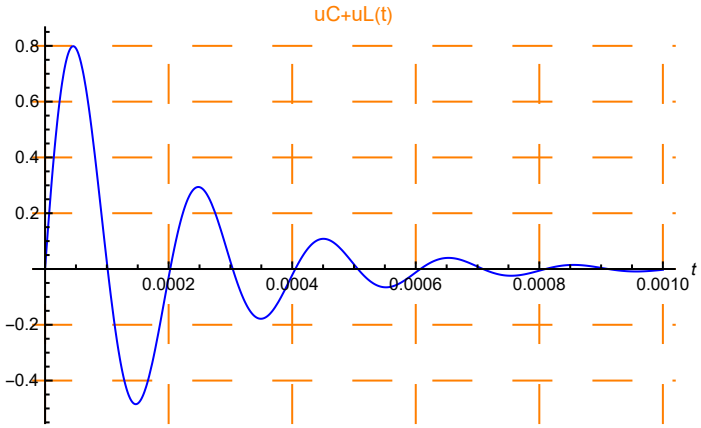
In[ ]:=
```
Plot[Ll * Cc * uc''[t], {t, 0, 5 / f0}, AxesOrigin → {0, 0}, GridLines → Automatic,
 GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "uL(t)", AxesLabel → {}, PlotStyle → {Thin, Blue}, PlotRange → Full]
```
stelle Funktion graphisch dar | Achsenursprung | Gitternetzlinien | automatisch
Stil der Gitternetzlinien | Anweisung | orange | gestrichelt | Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau | Koordinatenb··· | komplet

Out[ ]=



In[ ]:=
```
Plot[uc[t] + Ll * Cc * uc''[t], {t, 0, 5 / f0}, AxesOrigin → {0, 0}, GridLines → Automatic,
 GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "uC+uL(t)", AxesLabel → {}, PlotStyle → {Thin, Blue}, PlotRange → Full]
```
stelle Funktion graphisch dar | Achsenursprung | Gitternetzlinien | automatisch
Stil der Gitternetzlinien | Anweisung | orange | gestrichelt | Beschriftung der Graphik | Achsenbeschriftung | Darstellungsstil | dünn | blau | Koordinatenb··· | komplet

Out[ ]=



In[ ]:=
```
Plot[Rg * Cc * uc'[t], {t, 0, 5 / f0}, AxesOrigin → {0, 0}, GridLines → Automatic,
  GridLinesStyle → Directive[Orange, Dashed], PlotLabel → "uRg(t)", AxesLabel → {}, PlotStyle → {Thin, Blue}, PlotRange → Full]
```
stelle Funktion graphisch dar | Achsenursprung | Gitternetzlinien | automatisch

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

Out[ ]=