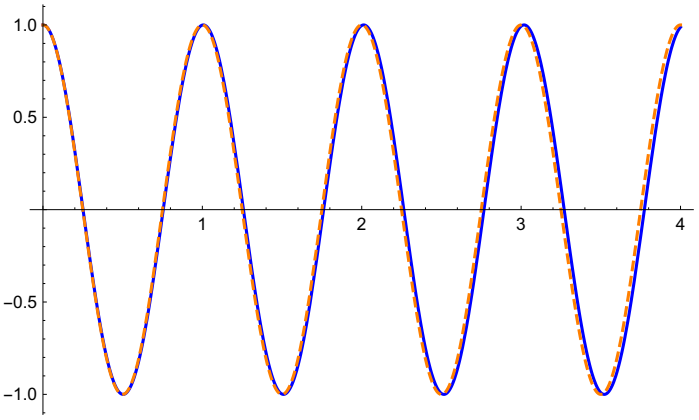
In[27]:=
```
x0 = 0.1 Pi;
dgl1 = {x''[t] + 4 Pi^2 * Sin[x[t]] == 0, x'[0] == 0, x[0] == x0};
(*Differentialgleichung mit Randbedingungen*)
sol1 = NDSolve[dgl1, x, {t, 0, 4}];
(*Numerische Lösung der Differentialgleichung*)
plot1 = Plot[{x[t] / x0} /. sol1, {t, 0, 4}, PlotStyle → Blue];
(*Tatsächlicher Verlauf*)
plot2 = Plot[{Cos[2 Pi t]}, {t, 0, 4}, PlotStyle → {Orange, Dashed}];
(*Vergleich mit der Näherung*)
Show[plot1, plot2]
```

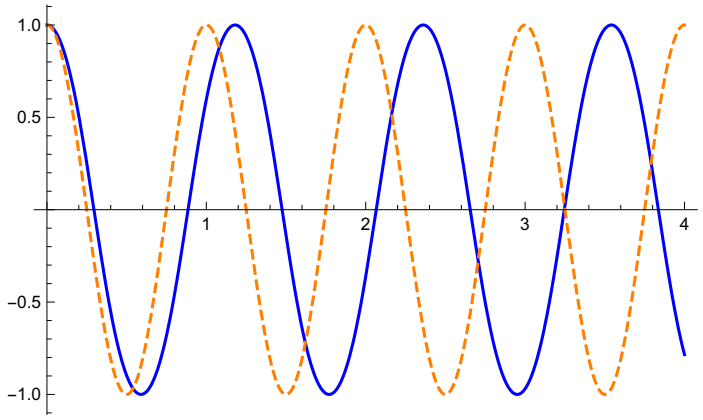
Out[28]=



■

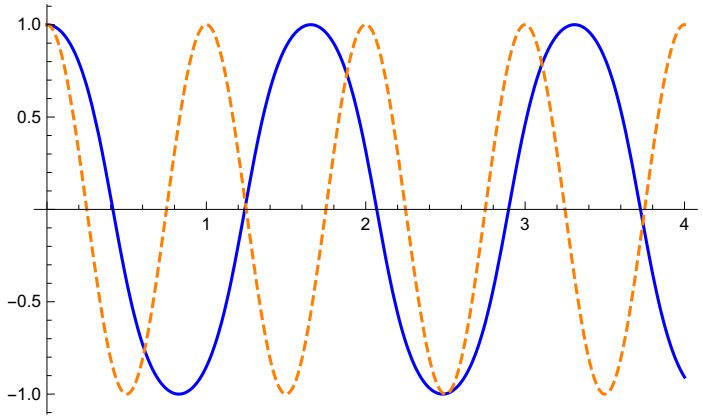
In[29]:=
```
x0 = 0.5 Pi;
dgl2 = {x''[t] + 4 Pi^2 * Sin[x[t]] == 0, x'[0] == 0, x[0] == x0};
sol2 = NDSolve[dgl2, x, {t, 0, 4}];
plot1 = Plot[{x[t] / x0} /. sol2, {t, 0, 4}, PlotStyle → Blue];
plot2 = Plot[{Cos[2 * Pi t]}, {t, 0, 4}, PlotStyle → {Orange, Dashed}];
Show[plot1, plot2]
```

Out[34]=



In[35]:=
```
x0 = 0.8 Pi;
dgl3 = {x''[t] + 4 Pi^2 * Sin[x[t]] == 0, x'[0] == 0, x[0] == x0};
sol3 = NDSolve[dgl3, x, {t, 0, 4}];
plot1 = Plot[{x[t] / x0} /. sol3, {t, 0, 4}, PlotStyle -> Blue];
plot2 = Plot[{Cos[2 Pi t]}, {t, 0, 4}, PlotStyle → {Orange, Dashed}];
Show[plot1, plot2]
```

Out[40]=



In[41]:=
```
x0 = 0.99 Pi;
dgl4 = {x''[t] + 4 Pi^2 * Sin[x[t]] == 0, x'[0] == 0, x[0] == x0};
sol4 = NDSolve[dgl4, x, {t, 0, 4}];
plot1 = Plot[x[t] / x0 /. sol4, {t, 0, 4}, PlotStyle → {Blue}];
plot2 = Plot[{Cos[2 Pi t]}, {t, 0, 4}, PlotStyle → {Orange, Dashed}];

Show[plot1, plot2]
```

Out[46]=