■ Gekoppelte Pendel mit Daemphung

```
g = 9.81; m = 1; L = 1; l = L/3; Df = 10; J = m L^2; c = 0.1;
```

```
ode1 = {J θ1''[t] == -c θ1'[t] - m g L θ1[t] + Df l^2 (θ2[t] - θ1[t]), θ1[0] == 1, θ1'[0] == 0}
```

$$\left\{\theta_1''[t] == -9.81\,\theta_1[t] + \frac{10}{9}\,(-\theta_1[t] + \theta_2[t]) - 0.1\,\theta_1'[t],\ \theta_1[0] == 1,\ \theta_1'[0] == 0\right\}$$

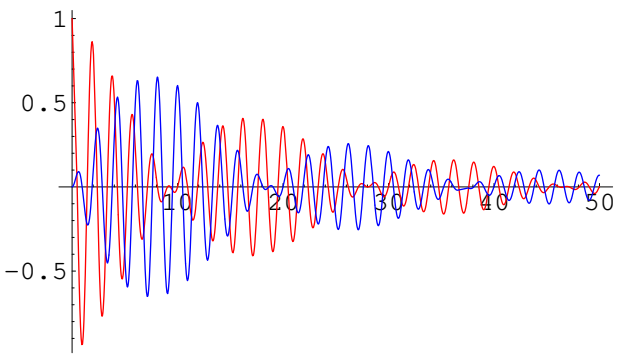
```
ode2 = {J θ2''[t] == -c θ2'[t] - m g L θ2[t] - Df l^2 (θ2[t] - θ1[t]), θ2[0] == 0, θ2'[0] == 0}
```

$$\left\{\theta_2''[t] == -9.81\,\theta_2[t] - \frac{10}{9}\,(-\theta_1[t] + \theta_2[t]) - 0.1\,\theta_2'[t],\ \theta_2[0] == 0,\ \theta_2'[0] == 0\right\}$$

```
result = DSolve[{ode1, ode2}, {θ1[t], θ2[t]}, t]
```

```
{{θ1[t] →
    e^(-0.1 t) ((0.5 + 1.73472 × 10^-18 i) e^(0.05 t) Cos[3.13169 t] + (0.5 - 1.73472 × 10^-18 i) e^(0.05 t)
       Cos[3.46839 t] + (0.0079829 - 4.46174 × 10^-17 i) e^(0.05 t) Sin[3.13169 t] +
      (0.00720796 + 4.02862 × 10^-17 i) e^(0.05 t) Sin[3.46839 t]),
  θ2[t] → e^(-0.1 t) ((0.5 + 1.73472 × 10^-18 i) e^(0.05 t) Cos[3.13169 t] -
      (0.5 + 1.73472 × 10^-18 i) e^(0.05 t) Cos[3.46839 t] + (0.0079829 - 1.68619 × 10^-17 i)
       e^(0.05 t) Sin[3.13169 t] - (0.00720796 - 1.5225 × 10^-17 i) e^(0.05 t) Sin[3.46839 t])}}
```

```
sol = {θ1[t], θ2[t]} /. result // Chop
```

```
{{e^(-0.1 t) (0.5 e^(0.05 t) Cos[3.13169 t] + 0.5 e^(0.05 t) Cos[3.46839 t] +
     0.0079829 e^(0.05 t) Sin[3.13169 t] + 0.00720796 e^(0.05 t) Sin[3.46839 t]),
  e^(-0.1 t) (0.5 e^(0.05 t) Cos[3.13169 t] - 0.5 e^(0.05 t) Cos[3.46839 t] +
     0.0079829 e^(0.05 t) Sin[3.13169 t] - 0.00720796 e^(0.05 t) Sin[3.46839 t])}}
```

```
Plot[Evaluate[sol], {t, 0, 50}, PlotStyle → {Red, Blue}];
```