In[]:=
```
z2 := a * Exp[-I * c1 * t] + b
```

In[]:=
```
z3 := r * Exp[-I * c1 * t] + g
```

In[]:=
```
z20 := A * Exp[I * c1 * t] + B
```

In[]:=
```
z30 := R * Exp[I * c1 * t] + G
```

In[]:=
```
z3
```

Out[]=
$$g + e^{-i\,c1\,t}\,r$$

In[]:=
```
pz2 := k1 * Exp[-I * c1 * t / 2] + I * a * c1 * Exp[-I * c1 * t] + I * b * c1
```

In[]:=
```
pz3 :=  k2 * Exp[-I * c1 * t / 2] + I * r * c1 * Exp[-I * c1 * t] + I * g * c1
```

In[]:=
```
Pz2 := K1 * Exp[I * c1 * t / 2] - I * A * c1 * Exp[I * c1 * t] - I * B * c1
```

In[]:=
```
Pz3 := K2 * Exp[I * c1 * t / 2] - I * R * c1 * Exp[I * c1 * t] - I * G * c1
```

In[]:=
```
deqn := 2 * c0 - (c1 / 2) * (z2 * z20 + z3 * z30) - (I / 4) * (z2 * Pz2) +
   (I / 4) * (z20 * pz2) - (I / 4) * (z3 * Pz3) + (I / 4) * (z30 * pz3)
```

In[]:=
```
DSolve[y'[t] == deqn, y[t], t]
```

Out[]=
$$\left\{\left\{y[t] \to -i\,e^{-i\,c1\,t}\,(a\,B + G\,r) - \frac{e^{-\frac{1}{2}i\,c1\,t}\,(B\,k1 - a\,K1 + G\,k2 - K2\,r)}{2\,c1} + i\,e^{i\,c1\,t}\,(A\,b + g\,R) + \frac{e^{\frac{i\,c1\,t}{2}}\,(A\,k1 - b\,K1 - g\,K2 + k2\,R)}{2\,c1} + 2\,c0\,t - c1\,(a\,A + b\,B + g\,G + r\,R)\,t + C[1]\right\}\right\}$$

In[]:=
```
y1 := -i e^-i c1 t (a B + G r) - 1/(2 c1) e^-1/2 i c1 t (B k1 - a K1 + G k2 - K2 r) + i e^i c1 t (A b + g R) +
   e^(i c1 t/2) (A k1 - b K1 - g K2 + k2 R)/(2 c1) + 2 c0 t - c1 (a A + b B + g G + r R) t + constant
```

In[]:=
```
y1
```

Out[]=
$$\text{constant} - i\,e^{-i\,c1\,t}\,(a\,B + G\,r) - \frac{e^{-\frac{1}{2}i\,c1\,t}\,(B\,k1 - a\,K1 + G\,k2 - K2\,r)}{2\,c1} + i\,e^{i\,c1\,t}\,(A\,b + g\,R) + \frac{e^{\frac{i\,c1\,t}{2}}\,(A\,k1 - b\,K1 - g\,K2 + k2\,R)}{2\,c1} + 2\,c0\,t - c1\,(a\,A + b\,B + g\,G + r\,R)\,t$$

In[•]:=
```
Expand[constant - i e^(-i c1 t) (a B + G r) - 1/(2 c1) e^(-1/2 i c1 t) (B k1 - a K1 + G k2 - K2 r) +
  i e^(i c1 t) (A b + g R) + (e^(1/2 i c1 t) (A k1 - b K1 - g K2 + k2 R))/(2 c1) + 2 c0 t - c1 (a A + b B + g G + r R) t]
```

Out[•]=
```
constant - i a B e^(-i c1 t) + i A b e^(i c1 t) - (B e^(-1/2 i c1 t) k1)/(2 c1) + (A e^(1/2 i c1 t) k1)/(2 c1) +
 (a e^(-1/2 i c1 t) K1)/(2 c1) - (b e^(1/2 i c1 t) K1)/(2 c1) - (e^(-1/2 i c1 t) G k2)/(2 c1) - (e^(1/2 i c1 t) g K2)/(2 c1) - i e^(-i c1 t) G r + (e^(-1/2 i c1 t) K2 r)/(2 c1) +
 i e^(i c1 t) g R + (e^(1/2 i c1 t) k2 R)/(2 c1) + 2 c0 t - a A c1 t - b B c1 t - c1 g G t - c1 r R t
```

In[•]:=
```
y1 := constant - i a B e^(-i c1 t) + i A b e^(i c1 t) - (B e^(-1/2 i c1 t) k1)/(2 c1) + (A e^(1/2 i c1 t) k1)/(2 c1) +
  (a e^(-1/2 i c1 t) K1)/(2 c1) - (b e^(1/2 i c1 t) K1)/(2 c1) - (e^(-1/2 i c1 t) G k2)/(2 c1) - (e^(1/2 i c1 t) g K2)/(2 c1) - i e^(-i c1 t) G r + (e^(-1/2 i c1 t) K2 r)/(2 c1) +
  i e^(i c1 t) g R + (e^(1/2 i c1 t) k2 R)/(2 c1) + 2 c0 t - a A c1 t - b B c1 t - c1 g G t - c1 r R t
```

In[•]:=
```
y1
```

Out[•]=
```
constant - i a B e^(-i c1 t) + i A b e^(i c1 t) - (B e^(-1/2 i c1 t) k1)/(2 c1) + (A e^(1/2 i c1 t) k1)/(2 c1) +
 (a e^(-1/2 i c1 t) K1)/(2 c1) - (b e^(1/2 i c1 t) K1)/(2 c1) - (e^(-1/2 i c1 t) G k2)/(2 c1) - (e^(1/2 i c1 t) g K2)/(2 c1) - i e^(-i c1 t) G r + (e^(-1/2 i c1 t) K2 r)/(2 c1) +
 i e^(i c1 t) g R + (e^(1/2 i c1 t) k2 R)/(2 c1) + 2 c0 t - a A c1 t - b B c1 t - c1 g G t - c1 r R t
```