In [1]:
```
from sympy import *
```

Example 1: Solve y'' + 5y' + 4y = sin(t)

In [2]:
```
t=symbols('t')
y=Function('y')
deq=diff(y(t),t,2)+5*diff(y(t),t)+4*y(t)-sin(t)
ysoln=dsolve(deq,y(t))
print('So the solution is',ysoln)
```

```
So the solution is Eq(y(t), C1*exp(-4*t) + C2*exp(-t) + 3*sin(t)/34 - 5*cos
(t)/34)
```

Example 2: 2y'' - 3y' -2y = 5e^(3t)+t^2

In [4]:
```
t=symbols('t')
y=Function('y')
deq=2*diff(y(t),t,2)-3*diff(y(t),t)-2*y(t)-5*exp(3*t)-t**2
ysoln=dsolve(deq,y(t))
print('The solution is',ysoln)
```

```
The solution is Eq(y(t), C1/sqrt(exp(t)) + C2*exp(2*t) - t**2/2 + 3*t/2 + 5
*exp(3*t)/7 - 13/4)
```

Example 3: 2y'' - 3y' - 2y = 5e^(2t)

In [5]:
```
t=symbols('t')
y=Function('y')
deq=2*diff(y(t),t,2)-3*diff(y(t),t)-2*y(t)-5*exp(2*t)
ysoln=dsolve(deq,y(t))
print('The solution is',ysoln)
```

```
The solution is Eq(y(t), C2/sqrt(exp(t)) + (C1 + t)*exp(2*t))
```

Example 4:Write the form of the particular solution to y'' + 2y' + 10y = e^(-t)sin(3t)

In [11]:
```
t=symbols('t')
y=Function('y')
deq=diff(y(t),t,2)+2*diff(y(t),t)+10*y(t)-exp(-t)*sin(3*t)
ysoln=dsolve(deq,y(t))
print('The solution is',ysoln)
print('The FORM of the particular solution has to be t*exp(-t)*(A*sin(3t)+B
*cos(3t))')
print('NOTE in this example, A=0 and B=-1/6')
```

```
The solution is Eq(y(t), (C2*sin(3*t) + (C1 - t/6)*cos(3*t))*exp(-t))
The FORM of the particular solution has to be t*exp(-t)*(A*sin(3t)+B*cos(3
t))
NOTE in this example, A=0 and B=-1/6
```

In [ ]: