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

Example 1: y'' + 2y' + 10y = delta(t-5), y(0)=y'(0)=0

(The command is DiracDelta(t-c))

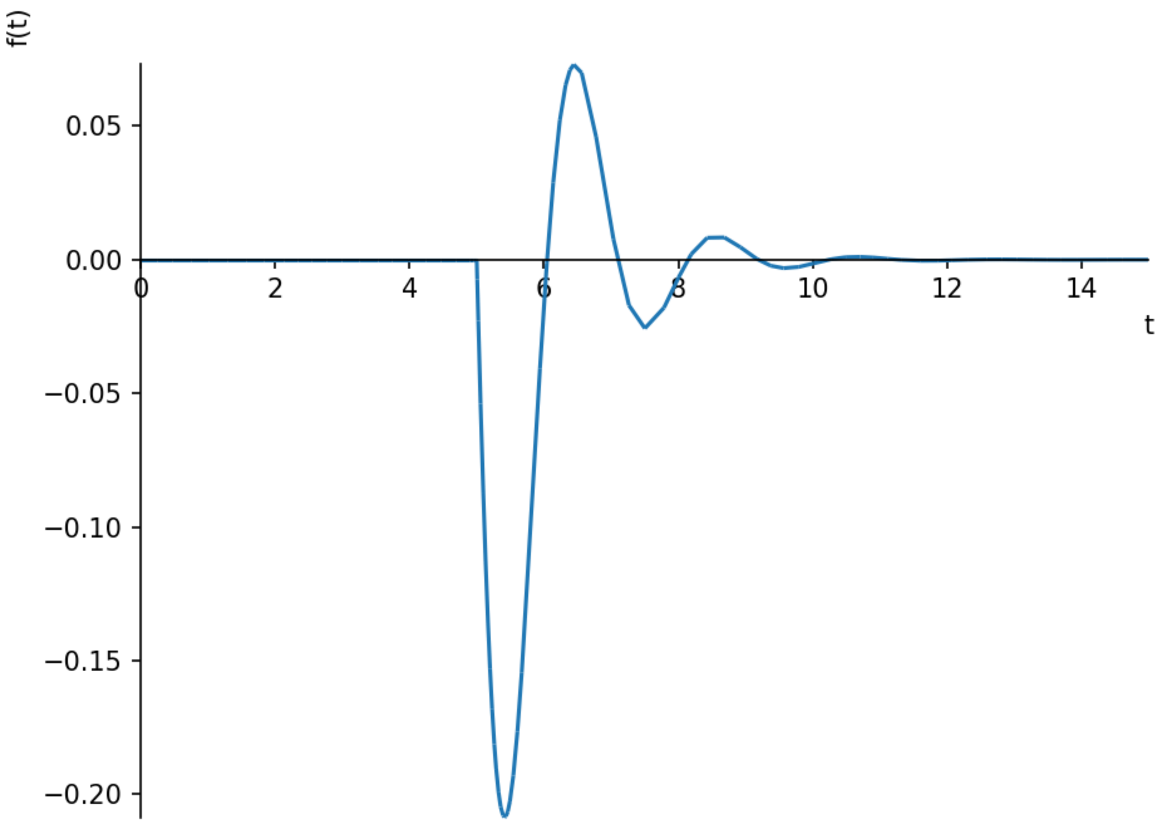
In [2]:
```
t=symbols('t')
y=Function('y')
g=DiracDelta(t-5)
deq=diff(y(t),t,2)+2*diff(y(t),t)+10*y(t)-g
ysoln=dsolve(deq,y(t),ics={y(0):0,diff(y(t),t).subs(t,0):0})
print('The solution is',ysoln)
```

```
The solution is Eq(y(t), exp(5)*exp(-t)*sin(3*t - 15)*Heaviside(t - 5)/3)
```

Again I will plot the solution to help visualize the motion

In [3]:
```
matplotlib notebook
```

In [7]:
```
y=ysoln.rhs
# NOTE: Since we call down "positive", I am multiplying the solution by -1
 to visualize this fact
plot(-1*y,(t,0,15))
```



Out[7]: <sympy.plotting.plot.Plot at 0x7ccd9b0>

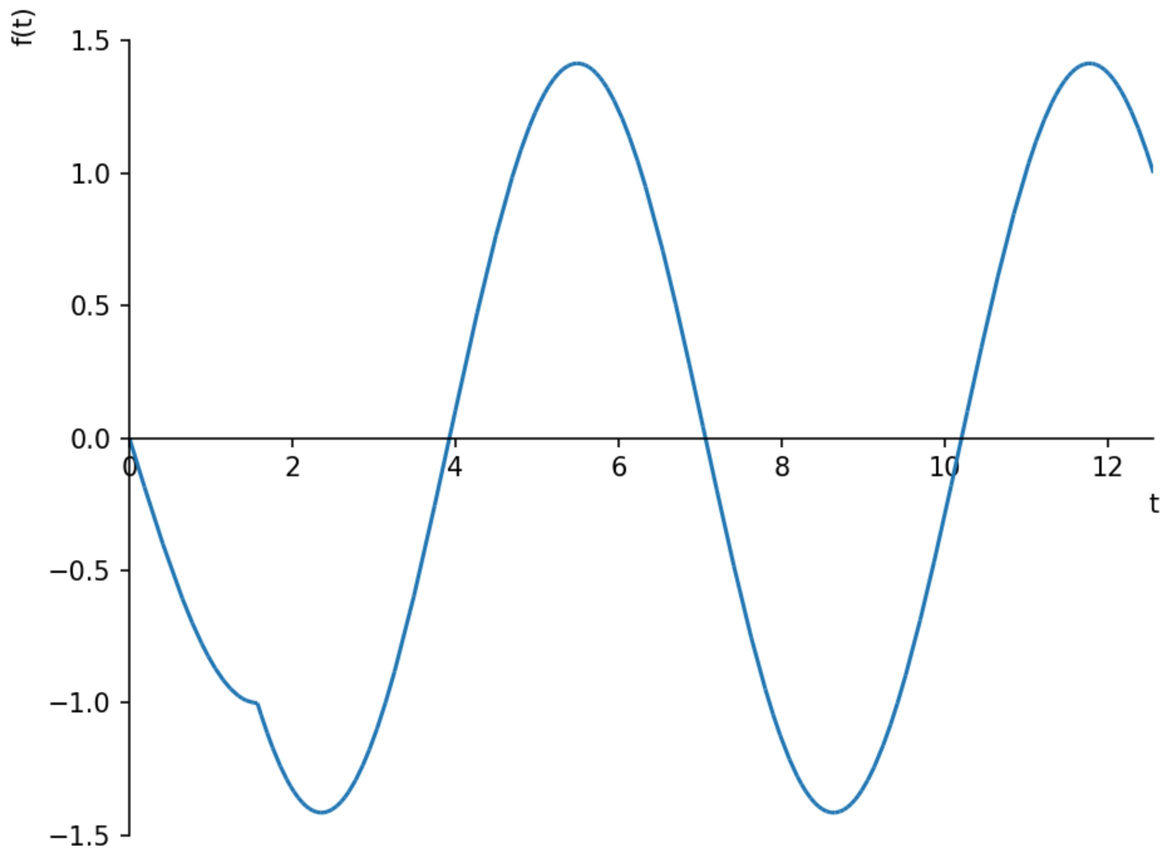
Example 2: y'' + y = delta(t-pi/2), y(0)=0, y'(0)=1

In [10]:
```
t=symbols('t')
y=Function('y')
g=DiracDelta(t-pi/2)
deq=diff(y(t),t,2)+y(t)-g
ysoln=dsolve(deq,y(t),ics={y(0):0,diff(y(t),t).subs(t,0):1})
print('The solution is',ysoln)
print('NOTE: in one class, it was pointed out that sin(t-pi/2) = -cos(t) so
the answer is equivalent to ours.')
```

```
The solution is Eq(y(t), sin(t) - cos(t)*Heaviside(t - pi/2))
NOTE: in one class, it was pointed out that sin(t-pi/2) = -cos(t) so the an
swer is equivalent to ours.
```

In [11]:
```
matplotlib notebook
```

In [13]:
```
y=ysoln.rhs
plot(-1*y,(t,0,4*pi))
```



Out[13]: <sympy.plotting.plot.Plot at 0xa0f7ed0>

In [ ]: