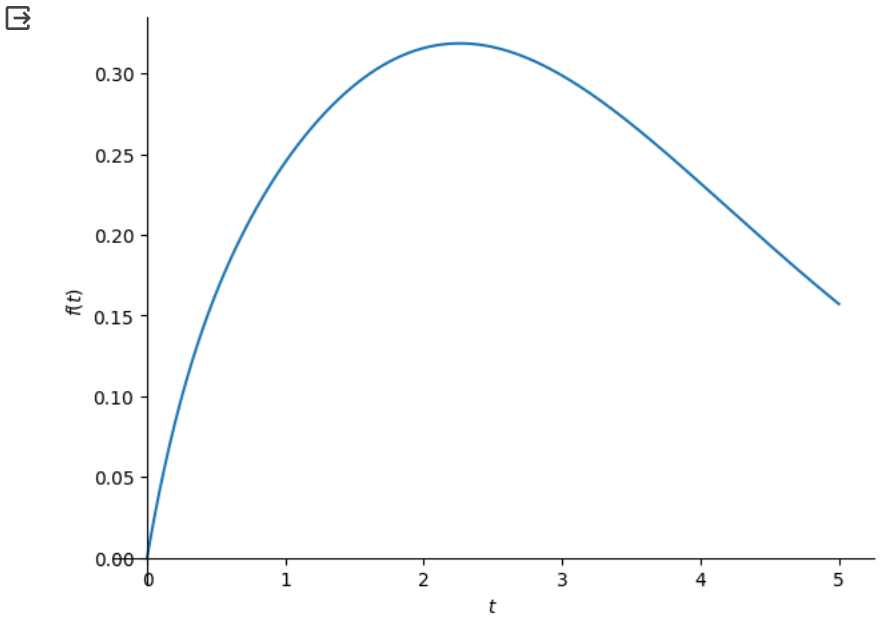
```
from sympy import *
t = symbols('t')
y = Function('y')
g = Function('g')

# this code solves y'' + c*y' + r*y = g(t), y(0) = 0, y'(0) = 0.5
# where c = 2, r = 1, and g(t) = t*exp(-t)
c, r = 2, 1
g = t*exp(-t)
deq = y(t).diff(t,2)+c*y(t).diff(t,1)+r*y(t)-g # the differential equation

soln = dsolve(deq,y(t),ics={y(0):0,y(t).diff(t,1).subs(t,0):0.5})  # solve equation with initial conditions
soln

plot(soln.rhs, (t,0,5), adaptive = False, nb_of_points = 500) # plot the solution for t in (0, 5)
```




```
<sympy.plotting.plot.Plot at 0x7c1bf4239e70>
```