In [0]:
```
# Change directory to VSCode workspace root so that relative path loac
# ms-python.python added
import os
try:
    os.chdir(os.path.join(os.getcwd(), '../../..'))
    print(os.getcwd())
except:
    pass
```

In [1]:
```
from sympy import *
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
# Initialization
t = symbols('t')
std_bound = (t,0,5)
init_printing()
```

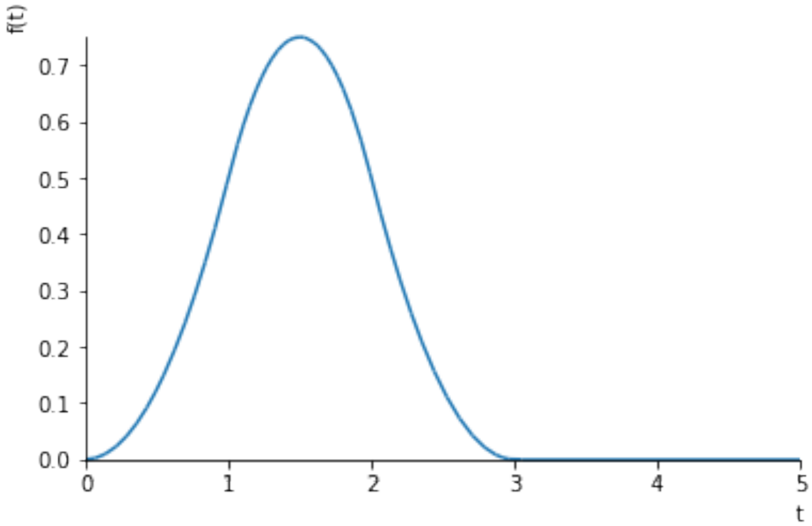
In [3]:
```
u = lambda t: Heaviside(t)
r = lambda t: t*u(t)
d = lambda t: DiracDelta(t)
```

Q1

$g(t) = r(t) - 2 \times r(t-1) + r(t-2)$
$h(t) = u(t) - u(t-1)$

$(g * h)(t) = \frac{r(t)^2}{2} - 3 \times \frac{r(t-1)^2}{2} + 3 \times \frac{r(t-1)^2}{2} - \frac{r(t-3)^2}{2}$

In [4]:
```
plot(r(t)**2/2-3*r(t-1)**2/2+3*r(t-2)**2/2-r(t-3)**2/2,(t,0,5))
```

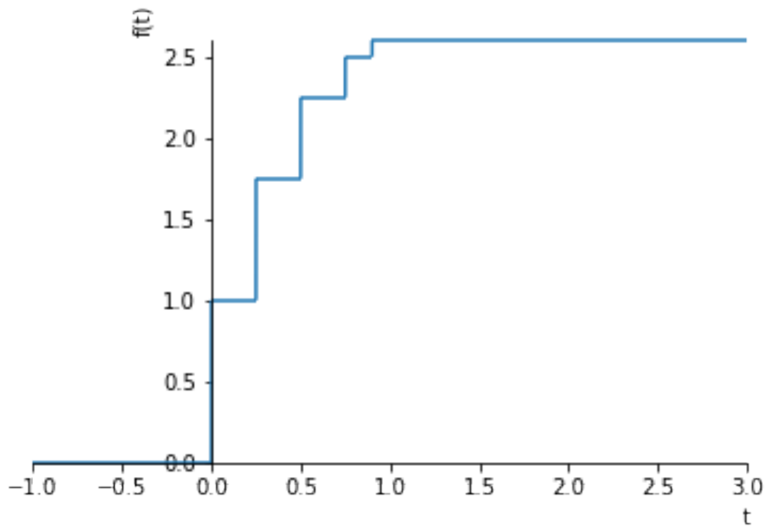


Out[4]:
```
<sympy.plotting.plot.Plot at 0x11a6d1cc0>
```

Q2

$g(t) = u(t)$
$h(t) = \delta(t) + .75\delta(t - .25) + .5\delta(t - .5) + .25\delta(t - .75) + .1\delta(t - .9)$
$(g * h)(t) = u(t) + .75u(t - .25) + .5u(t - .5) + .25u(t - .75) + .1u(t - .9)$

In [5]:
```
g_c_h = u(t)+.75*u(t-.25)+.5*u(t-.5)+.25*u(t-.75)+.1*u(t-.9)
plot(g_c_h,(t,-1,3))
# u(t)+.75*u(t-.25)+.5*u(t-.5)+.25*u(t-.75)+.1*u(t-.9)
```

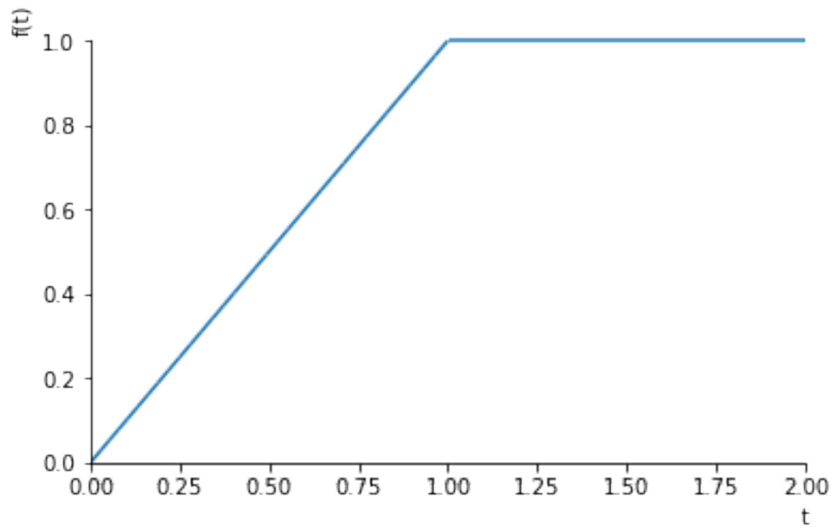


Out[5]: <sympy.plotting.plot.Plot at 0x11c8e7c18>

Q3

$g(t) = r(t)$
$h(t) = \delta(t) - \delta(t-1)$
$(g * h)(t) = r(t) - r(t-1)$

In [6]:
```
g_c_h = r(t)-r(t-1)
plot(g_c_h,(t,0,2))
```



Out[6]: <sympy.plotting.plot.Plot at 0x11c8e7e48>