bateman_integral

January 11, 2018

In [1]:
```
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
%matplotlib inline
%load_ext autoreload
%autoreload 2
#
import sympy
from sympy import symbols, integrate, diff
from sympy.functions import exp
from sympy import init_printing
init_printing(use_unicode=True)
```

0.1 Integrate secular Bateman equation

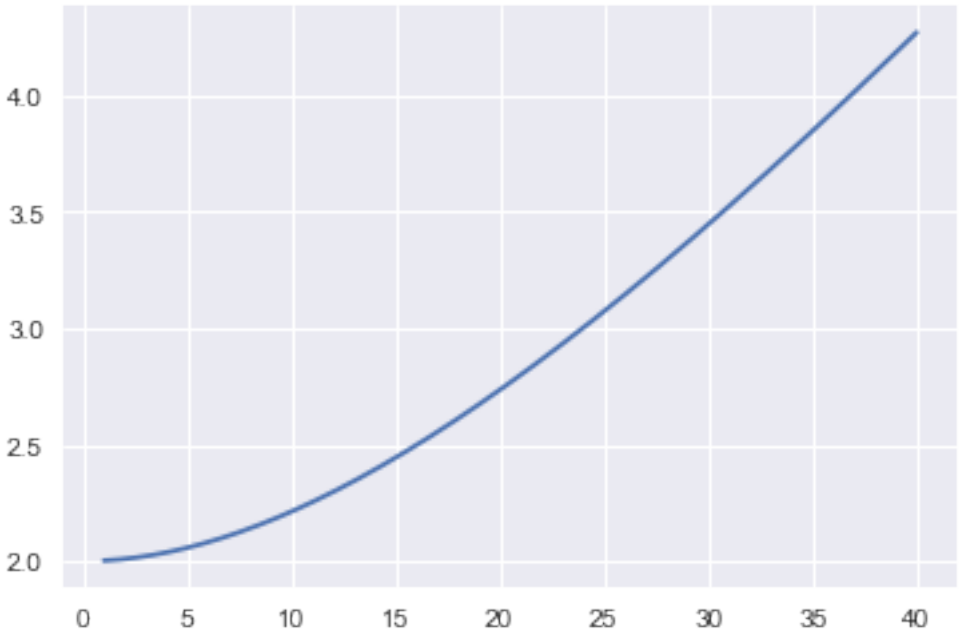
In [5]:
```
a_p, a_d, L_d, t = symbols('a_p, a_d, L_d, t', positive = True)
a_d = a_p * (1 - exp(-L_d*t))
integrate(a_d, t)
```

Out[5]:

$$a_p t + \frac{a_p}{L_d e^{L_d t}}$$

In [6]:
```
t = np.linspace(1, 40,300)
y = 0.1 * t + (0.1/0.05) * np.exp(-0.05 * t)
plt.plot(t,y)
```

Out[6]:
```
[<matplotlib.lines.Line2D at 0x170b08c9780>]
```


4.0
3.5
3.0
2.5
2.0
0
5
10
15
20
25
30
35
40