```
 1 #Problem 2-2
 2
 3 import numpy as np
 4 import matplotlib.pyplot as plt
 5
 6 def LagrangePolynomialMethod(t_data,x_data,l=100,p=0.1):
 7     n=len(t_data)
 8     t_max=int(max(t_data)*(1+p))
 9     t_min=int(min(t_data)*(1-p))
10     t_vec=np.linspace(t_min,t_max,l)
11     x_vec=[]
12
13     for i in t_vec:
14         sum=0
15         for j in range(n):
16             product=1
17             for k in range(n):
18                 if k!=j:
19                     product=product*(i-t_data[k])/(t_data[j
   ]-t_data[k])
20             sum=sum+x_data[j]*product
21         x_vec.append(sum)
22
23     plt.style.use('ggplot')
24     fig = plt.figure()
25     ax1 = fig.add_subplot(111)
26     ax1.scatter(t_data,x_data,label='Input Data',color='r')
27     ax1.plot(t_vec,x_vec,'g--',label='Fitted Lagrange
   Polynomial')
28     plt.title('Problem 2-2')
29     plt.legend()
30     plt.show()
31
32
33 t_data = np.array(range(1,11))
34
35 x_data = t_data - 0.2 * (t_data ** 2) + 0.3 * (t_data ** 3
   ) - 0.4 * (t_data ** 4) + 0.5 * (t_data ** 5)
36 print(t_data)
37 print(x_data)
38
39 LagrangePolynomialMethod(t_data,x_data)
40
41
```